LR1

SERVICE MANUAL

Canon

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Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

Corrections

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This manual has been produced on an Apple Power Macintosh 7300/180 personal computer and OKI MICROLINE 803 PSIIV laser beam printer; artworks of printing films were printed on Agfa SelectSet Avantra 25. All page layouts, logos, and parts-list data were saved with Canon Optical Disc Subsystem mo-5001S™ and Optical Disc Cartridge mo-502M™, and Interface Kit mo-IF2™ for Macintosh. All graphics were produced with MACROMEDIA FREEHAND™ 7.0J. All documents and all page layouts were created with QuarkXpress™ 3.3 Japanese version.

I. ABOUT THIS MANUAL

This manual is divided into five sections, and contains information required for serving the unit.

Part 1: Product Specifications
This section contains outlines and product specifications of the unit.

Part 2: Maintenance
This section explains how to maintain the unit. Descriptions and adjustment of assembly/disassembly and verification methods after assembly/disassembly are included.

Part 3: Operation
This section explains how to operate the unit properly. Operation procedures for service modes are explained.

Part 4: Troubleshooting
This section explains how to find out possible causes of troubles and units/parts to be replaced. It is divided into two parts: troubleshooting by error indications and by symptoms.

Part 5: Appendix
This section includes block diagrams of the unit and information to technically understand the hardware (applied for new techniques only). This section also includes pin arrangements.

Sufficient information regarding assembly/disassembly is not given in this manual. Refer to the illustrations in the separate *Parts Catalog*.

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Part 1

PRODUCT OUTLINE

1. PRODUCT OUTLINE

1.1 Product Outline

This is Canon's first bubble-jet printer for use with a set top box (STB).
The design is a complete departure from conventional printers geared for personal computers. The printer is designed to resemble an AV component to match the living room interior.
It also has a MODE SELECTION switch, ink-low warning, and other functions which are required as a non-PC printer. The large-capacity ink cartridges also make ink cartridge replacements less frequent.

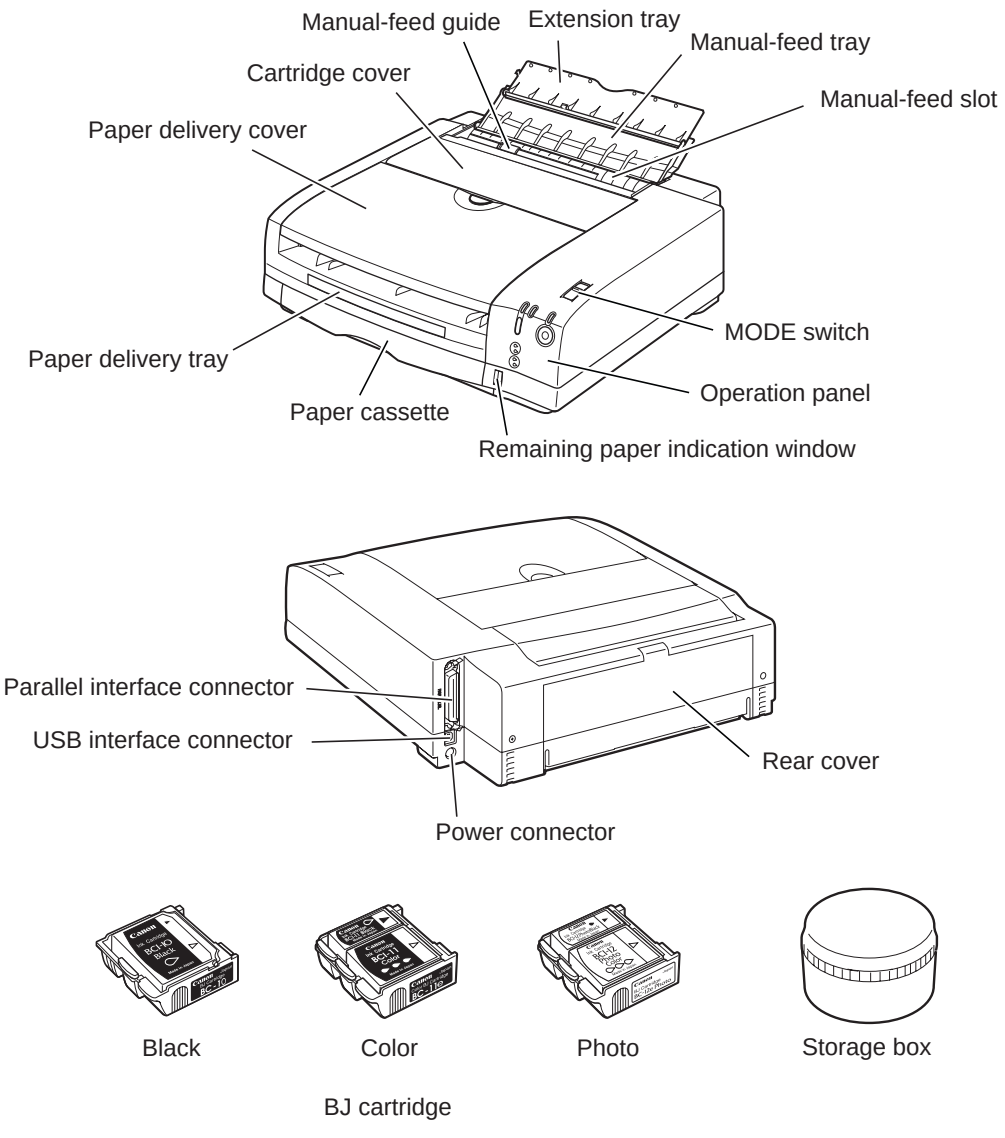

Figure 1-1 Exterior of Printer

1.2 Features

1) The printer is connected to the TV via the STB to enable images from the Internet to be printed. It can also be used as a PC printer.

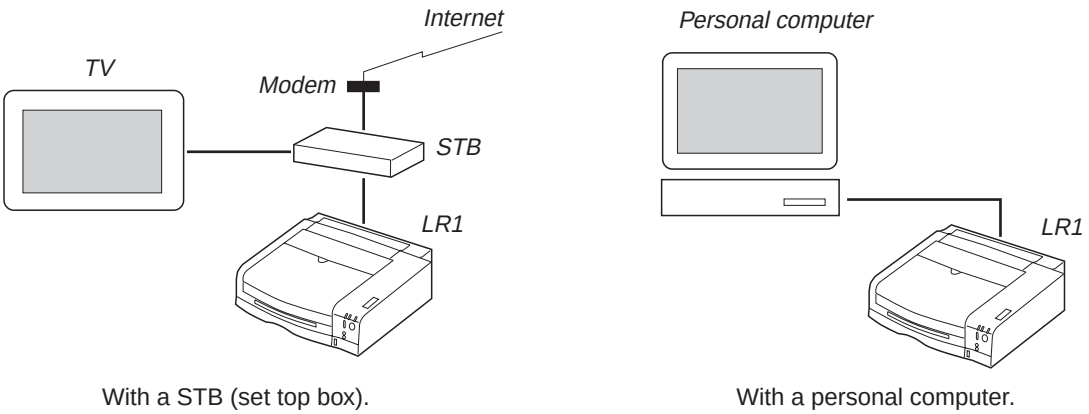

Figure 1-2 Possible System Configurations

2) By using a paper cassette and the operation panel on the front of the printer, front-end operation is easy.

3) The printer uses three types of BJ cartridges: Black, color, and photo color. The black and color cartridges use large-capacity ink cartridges to make ink cartridge replacement less frequent.

Black BJ cartridge BC-10 (optional): 128-nozzle head with detachable ink cartridge

Color BJ cartridge BC-11e: 136-nozzle head (64-nozzles for Bk and 24 nozzles each for Y, M, and C) with detachable ink tank and ink-drop modulation technology

Photo Color BJ cartridge BC-12e (optional): 136-nozzle head (64-nozzles for Bk and 24 nozzles each for Y, M, and C) with detachable ink cartridge and ink-drop modulation technology

Ink Cartridge BCI-10 Black:	For BC-10 Black
Ink Cartridge BCI-17 Black:	For BC-10 large-capacity Black
Ink Cartridge BCI-11 Black:	For BC-11e Black
Ink Cartridge BCI-11 Color:	For BC-11e Color (YMC integrated)
Ink Cartridge BCI-18 Black:	For BC-11e large-capacity Black
Ink Cartridge BCI-18 Color:	For BC-11e large-capacity Color (YMC integrated)
Ink Cartridge BCI-12 Black:	For BC-12e Photo Black
Ink Cartridge BCI-12 Color:	For BC-12e Photo Color (YMC integrated)

4) The remaining ink amount is calculated with the dot counter. An *INK-LOW* indicator is also provided.

5) Bitmap fonts for the Internet are built-in for high-quality and quick text output.

2. SPECIFICATIONS

2.1 Printer Specifications

2.1.1 Printer specifications

Type	Desk-top serial color printer, non-PC printer for STB
Paper Feed System	Automatic feed (cassette)/Manual feed (manual feed tray)
Resolution	360 × 720 dpi (Max. resolution)
Throughput (Reference only)	High-speed / Standard / High-quality BC-10 Black Cartridge Black Text (PC Magazine) 3.5 ppm / 3.2 ppm / - New monochrome pattern (E) 4.1 ppm * / 3.9 ppm * / 1.0 ppm BC-11e Color Cartridge New color pattern (E) 1.9 ppm * / 1.6 ppm * / 0.3ppm BC-12e Photo Cartridge Full Address Printing - / - / 0.1 ppm * * Catalog specification.
Printing Direction	Unidirectional (automatically selected according to the print data)
Max. Print Width	203 mm
Line Feed Speed	Approx. 136 ms/line: 9.03 mm (128/360 inch) carriage return
Interface	USB and IEEE 1284-standard, 8-bit parallel (Compatible/Nibble)
Cassette Capacity	Plain paper: 5 mm max. (Approx. 50 sheets at 75 g/m^2)
Manual Feed Tray Capacity	1 sheet
Detection Function	Cartridge cover-open detection: Provided BJ cartridge detection: Provided BJ cartridge identification: Provided Ink-low detection sensor: Provided Waste ink capacity detection: Provided Paper width detection: None
Operating Noise	Approx. 45 dB (A): Sound pressure level conforms to ISO 9296.
Ambient Conditions	During operation: Temperature 5°C-35°C (41°F-95°F) Humidity 10%-90% RH (No condensation) During non-operation: Temperature 0°C-35°C (32°F-95°F) Humidity 5%-95% RH (No condensation)
Power Source	Power voltage/frequency: 100-240 VAC 50/60 Hz Power consumption: During printing: Approx. 30 W During standby: Approx. 2 W Soft power off: Approx. 2 W
External Dimensions	Approx. 365mm W × 364mm D × 110 mm H
Weight	Approx. 4.0 kg (excluding BJ cartridge)
Certification	Radio wave interference: FCC, SISPR 22, CE Mark Electrical safety: UL, CSA, IEC, GS, FIMKO, SEMCO, AS/NZS, CCIB, SISIR, EI, NEMKO, Korean Electric Commerce Environmental: Energy Star, Blue Angel

2.1.2 Printer life

The printer's life shall be until any of the following conditions is attained:

(1) A total of 12,000 sheets are printed with the1,500-character standard pattern in black ink

(2) A total of 6,000 sheets are printed with the color printing standard pattern at 7.5% duty per color

(3) A total of 2,000 sheets are printed with photographic standard patterns

(4) Five years of operation elapses

2.2 Paper Specifications

2.2.1 Paper sizes and weights

(1) Paper sizes

A4, B5, A5, letter, envelope (Com #10/DL-size)

(2) Weight

64-105 g/m^2 for cassette feeding

2.2.2 Paper types and handling

Type		Size	Feed method	Capacity
Plain paper		A4/LTR	Cassette	Approx. 5 mm or less (Approx. 50 sheets of 75 g/m^2 weight)
		A4/B5/LTR/A5	Manual	1 sheet
Plain paper for Color BJ	LC-301*	A4/LTR	Cassette	Approx. 5 mm or less (Approx. 50 sheets of 75 g/m^2 weight)
			Manual	1 sheet
High-quality paper	HR-101*	A4/LTR	Cassette	Approx. 5 mm or less (Approx. 40 sheets)
			Manual	1 sheet
Photo glossy paper	GP-301*	A4/LTR	Manual	1 sheet
Glossy film	HG-101*	A4/LTR	Manual	1 sheet
Transparency film	CF-102*	A4/LTR	Manual	1 sheet
Back print film	BF-102*	A4/LTR	Manual	1 sheet
Banner	BP-101*	A4/LTR	Manual	1 sheet
T-shirt transfer	TR-201*	A4/LTR	Manual	1 sheet
Photo glossy card	FM-101*	120 mm × 216 mm	Manual	1 sheet
Envelope	Com #10 DL-size	241 mm × 105 mm 220 mm × 110 mm	Manual	1 sheet 1 sheet

* Paper dedicated to BJ printers.

Note 1: The printing side of the paper is stacked face-down in the cassette.

Note 2: Only A4 or letter-size paper can be fed from the paper cassette.

2.2.3 Printable area

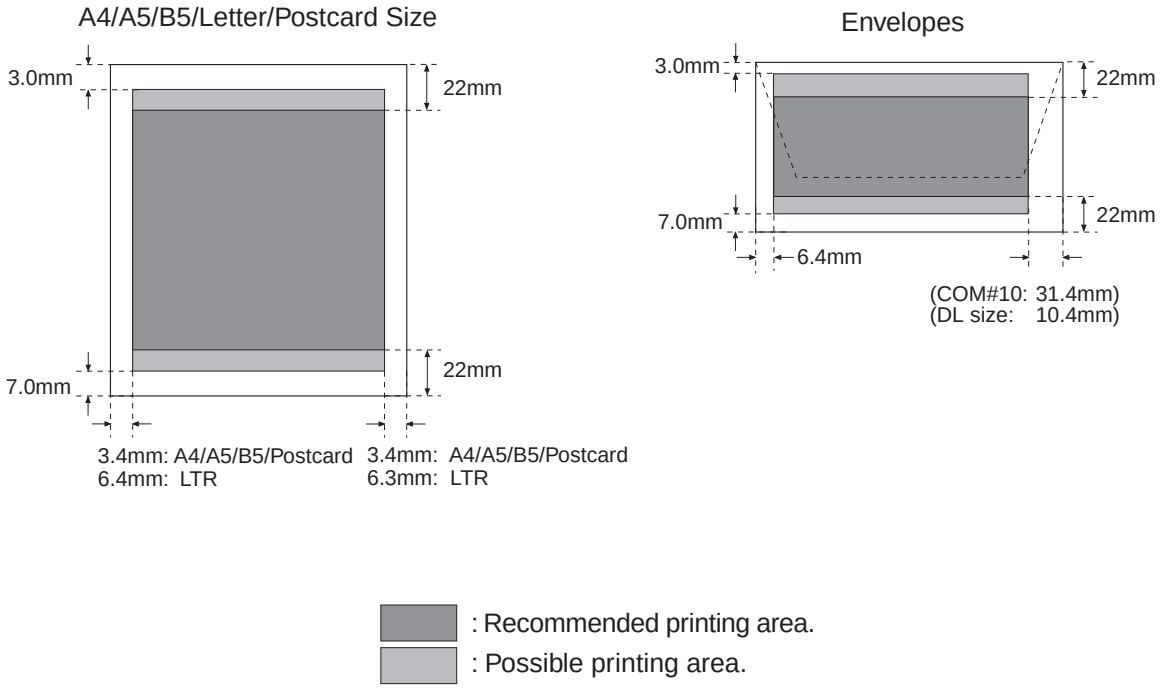

Figure 1-3 Printable Area

2.3 BJ Cartridge Specifications

	Black BJ Cartridge BC-10	Color BJ Cartridge BC-11e	Photo BJ Cartridge BC-12e
Construction	Detachable ink cartridge	Detachable ink cartridge	Detachable ink cartridge
Head	128 nozzles (Vertical array) Bk (128 nozzles × 1)	136 nozzles (Vertical array) Bk (64 nozzles × 1) C, M, Y (24 nozzles × 3)	136 nozzles (Vertical array) Bk (64 nozzles × 1) C, M, Y (24 nozzles × 3)
Ink colors	Bk	Bk, C, M, Y	Photo Bk, Photo C, Photo M, Y
Ink cartridge	BCI-10 Black BCI-17 Black (large-capacity)	BCI-11 Black BCI-11 Color BCI-18 Black (large-capacity) BCI-18 Color (large-capacity)	BCI-12 Black (Photo) BCI-12 Color (Photo)
Weight	26 g (with BCI-10 installed)	29 g (with BCI-11 installed)	29 g (with BCI-12 installed)
Service Life	Approx. 3,000 sheets*2	Approx. 2,000 sheets*3	Approx. 200 sheets*4
Printable Sheets*1	Approx. 170 sheets (BCI-10)*2 Approx. 270 sheets (BCI-17)*2	Color : Approx. 30 sheets (BCI-11)*3 Black : Approx. 25 sheets (BCI-11)*3 Color : Approx. 50 sheets (BCI-18)*3 Black : Approx. 40 sheets (BCI-18)*3	Approx. 20 sheets*5

*1 : The number of sheets per ink cartridge
*2 : 1,500-character standard pattern.
*3 : 7.5% duty per color (using standard pattern).
*4 : Average 16.7% duty per color.
*5 : 7.5% duty per color (calculated values by ink volume used).

2.4 Interface Specifications

2.4.1 Parallel interface

1) Interface type

IEEE 1284 parallel interface

2) Data transfer method

8-bit parallel transfer (Compatibility mode and nibble mode supported)

3) Signal level

Input

"Low" level: 0.0 V to +0.8 V
"High" level: +2.0 V to +5.0 V

Output

"Low" level: 0.0 V to +0.4 V
"High" level: +2.4 V to +5.5 V

4) Input/Output

+5 V pull-up for all signals

5) Interface cable

Cable: Twisted-pair, double-shielded cable, 2.0 m or shorter
Must conform to IEEE 1284.
Wire material: AWG (American Wire Gauge) No. 28 or higher

6) Interface connector

On printer: Amphenol 57-40360 or equivalent
On cable: Amphenol 57-30360 or equivalent

7) I/O signal and pin array

For details, see *"Part 5: CONNECTOR LOCATION AND PIN ARRAY" on page 5-13*.

2.4.2 Serial interface

1) Interface type

USB (Universal Serial Bus conforming to USB Specification Revision 1.0)

2) Data transfer method

Control transfer
Bulk transfer

3) Signal level

-Data, +Data

Difference input sensitivity: +0.2 V (Min.)
"H" level output voltage: +2.8 V to +3.6 V
"L" level output voltage: +0.0 V to +0.3 V

Vcc

"H" level input voltage: +2.0 V to +5.5 V
"L" level input voltage: +0.0 V to +0.8 V

4) Input/Output

3.3 V pull-up for +Data signal

5) Interface cable

Cable: Twisted-pair, shielded cable, 5.0 m or shorter
Must conform to USB.
Wire material: AWG (American Wire Gauge) No. 28 or higher

6) Interface connector

On printer: USB with series-B receptacle
On cable: USB with series-B plug

7) I/O signal and pin array

For details, see *"Part 5: CONNECTOR LOCATION AND PIN ARRAY" on page 5-13*.

2.5 Printer Drivers

The compatibility between printer drivers and interface ports is shown below.

	Printer Driver	
	Parallel I/F	USB I/
Windows 95/98	○	△*
Windows NT4.0	×	×
Windows 2000	×	×
Macintosh	×	×

○: Compatible, △: Compatible under certain conditions, ×: Incompatible

* For USB, compatibility is assured only with personal computers preinstalled with Windows 98.

3. PACKING

After opening the package, make sure all the items below have been included.

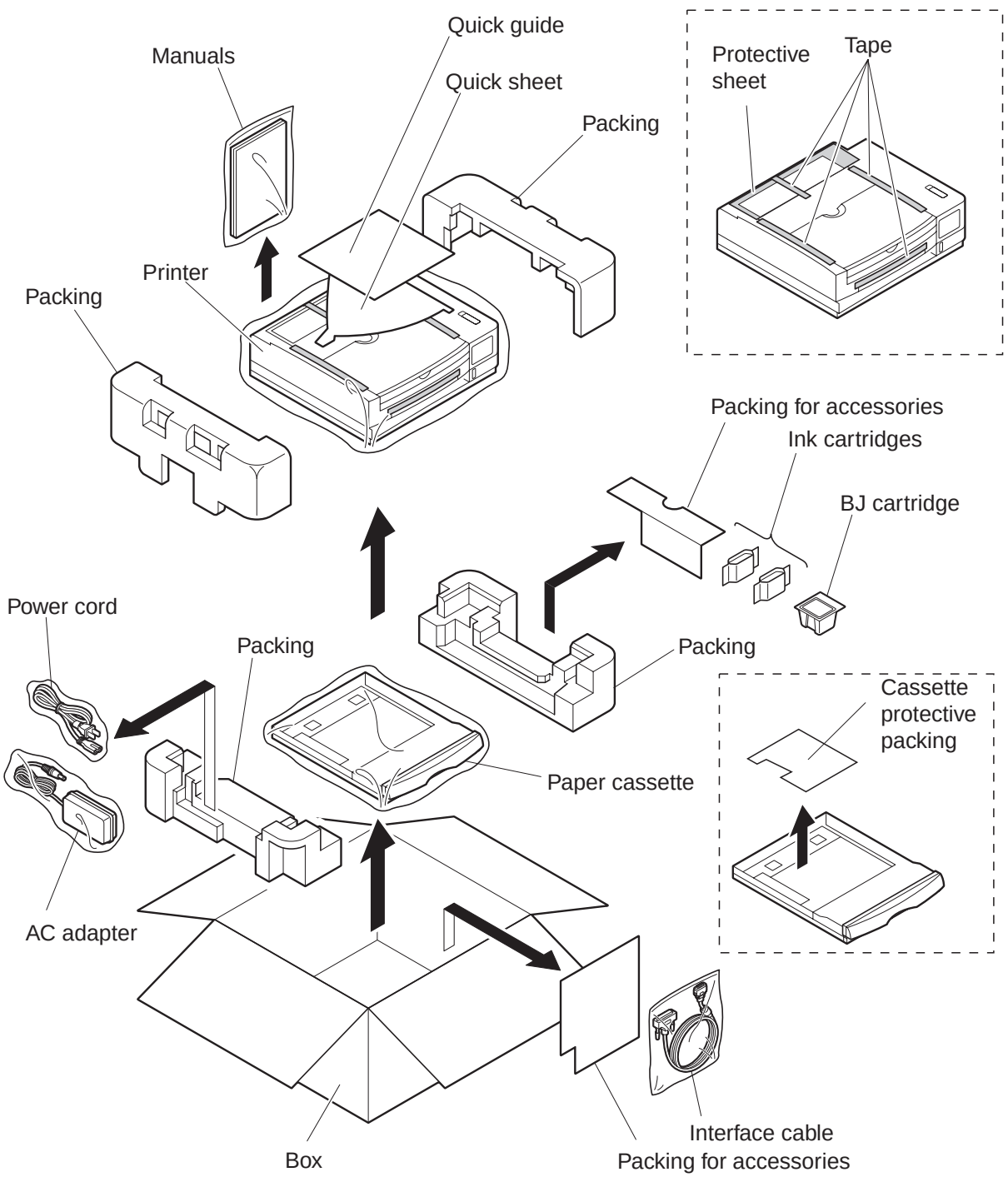

Figure 1-4 Packing

4. INSTALLATION

For installation details, see the User's Manual.

4.1 Installation Location

For optimum use, place the printer where there is enough space. The printer's external dimensions are shown below.

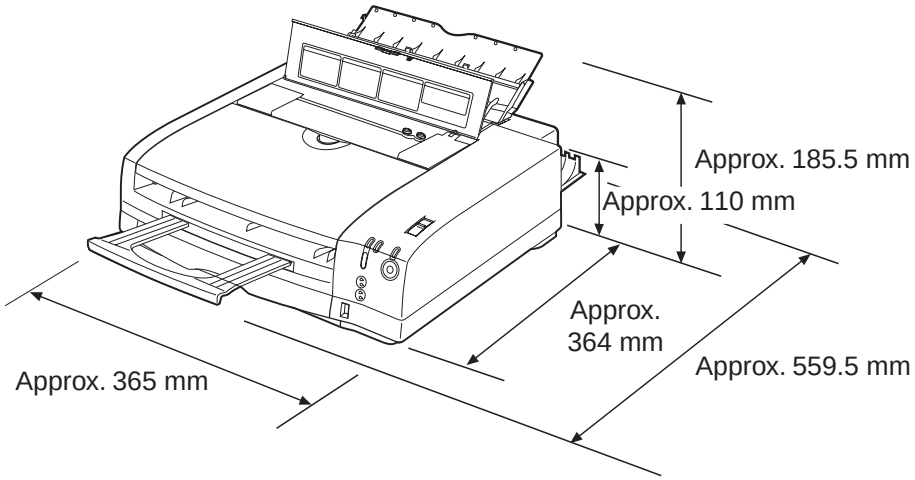

Figure 1-5 Installation Space

4.2 Installation Procedure

To prevent an electric potential difference between the computer and printer, first connect the interface cable, then connect the AC plug into an AC power outlet.

4.2.1 Connecting the centronics interface cable

1) Make sure the printer and computer's power is off.
2) Connect the interface cable to the printer's interface connector. Lock the connection with the cable's connector clips.
3) Connect the other end of the interface cable to the computer and lock the connection.

4.2.2 Connecting the USB interface cable

1) Connect the interface cable to the printer's interface connector. Lock the connection with the cable's connector clips. It is unnecessary to turn off the printer or computer before connecting cables. The cable can be connected while their powers are turned on.
2) Connect the other end of the interface cable to the computer and lock the connection.

4.2.3 Connecting to a power supply

1) Connect the AC plug of the power cable to an AC power outlet and the DC plug of the AC adapter to the printer.
2) Press the printer's *POWER* button to turn on the printer. First, all the indicators on the printer will light. Then the *POWER* indicator will light and the *BUSY* indicator will blink during the initialization operation. After the initialization ends, the *BUSY* indicator will turn off. If a BJ cartridge has not been installed, the *ERROR* indicator will light and the beeper will sound three times. The carriage will also move to the cartridge replacement position.

5. NAMES AND FUNCTION OF PARTS

The names and major functions of parts are shown below.

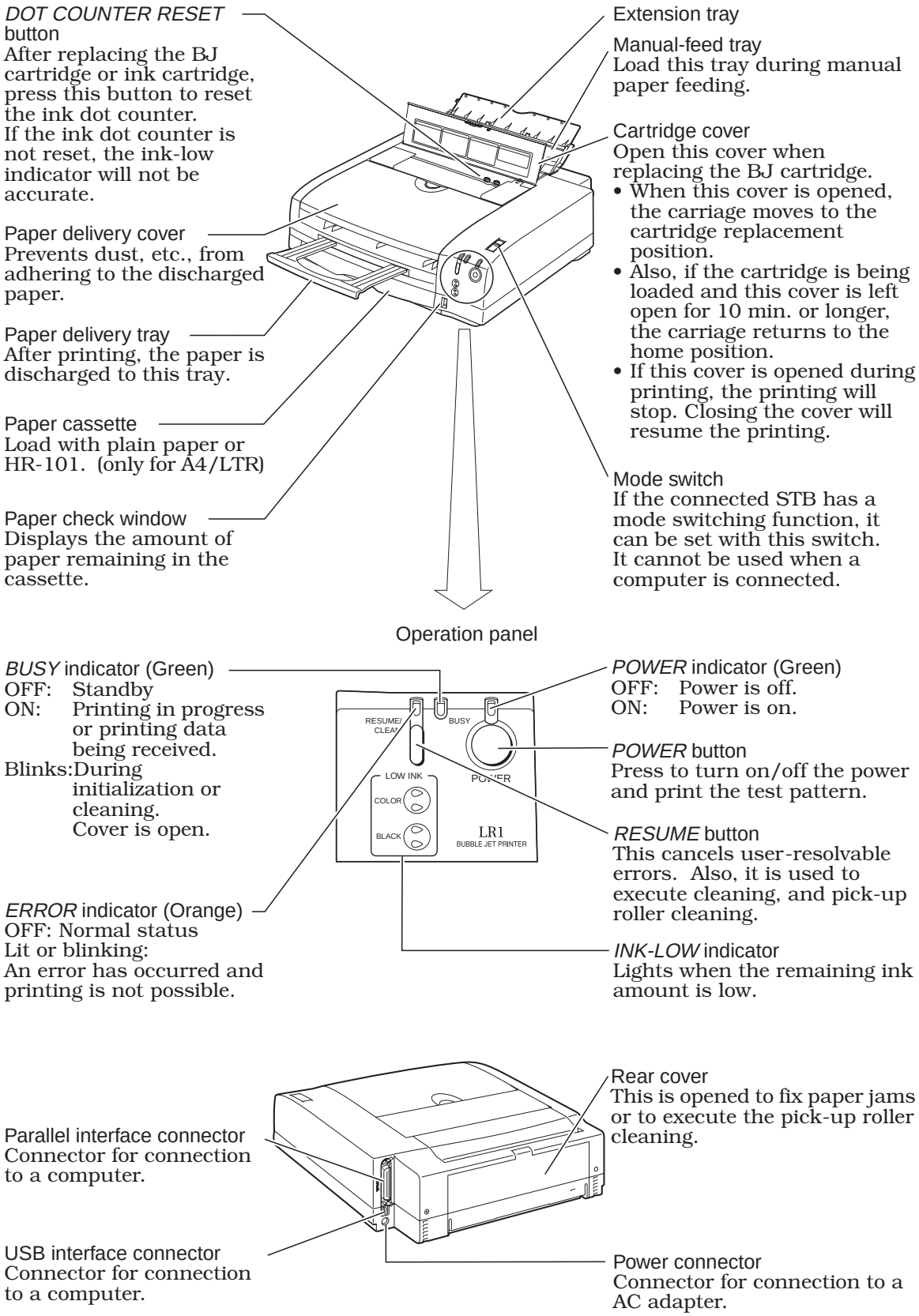

Figure 1-6 Parts Names and Major Functions

6. PARTS CODE LIST

A list of printer parts, consumables, and optional equipment are listed below.

Table 1-1 PARTS CODE

Item		Designation	Product Code
Printer	-	LR1*	Q30-3220
BJ cartridge	Black	BC-10	F45-0631
	Color	BC-11e	F45-1321
	Photo	BC-12e Photo	F45-1751
Ink cartridge	Black	BCI-10Bk	F47-0751
	Black (large-capacity)	BCI-17Bk (large-capacity)	F47-2721
	Black	BCI-11Bk	F47-0761
	Color	BCI-11Color	F47-0771
	Black (large-capacity)	BCI-18Bk (large-capacity)	F47-2731
	Color (large-capacity)	BCI-18Color (large-capacity)	F47-2741
	Photo black	BCI-12Bk	F47-2751
	Photo color	BCI-12Color	F47-2761
Cartridge storage box	-	SB-11	Q70-4120
Universal Adapter	-	AD360U	Q70-3839
Power cable	-	-	Q70-3980

* Items included with LR1: BC-11e, BCI-18 Bk, BCI-18 Color, AD 360U, power cable, parallel interface cable.

Part 2

MAINTENANCE

1. PERIODIC REPLACEMENT PARTS AND MAINTENANCE

1.1 Periodic Replacement Parts

Level	Replacement Parts
User	None
Service personnel	None

1.2 Consumables

Level	Consumables			
User		For Black BJ Cartridge	For Color BJ Cartridge	For Photo BJ Cartridge
	BJ Cartridge	BC-10	BC-11e	BC-12e
	Ink Cartridge	BCI-10	Bk: BCI-11 Bk Color: BCI-11 Color	Bk: BCI-12 Bk Color: BCI-12 Color
	Large-Capacity Ink Cartridge	BCI-17	Bk: BCI-18 Bk Color: BCI-18 Color	None
Service personnel	None			

1.3 Periodic Maintenance

Level	Periodic Inspections
User	None
Service personnel	None

2. DISASSEMBLY AND REASSEMBLY

2.1 Tools

Tools required for disassembly and reassembly are listed below.

Ordinary Tools	Remarks
Phillips screwdriver	For the removal and installation of screws.
Blade screwdriver	For the removal of plastic parts.
Needle-nosed pliers	For the removal and installation of springs.
Tweezers	For the disconnection and connection of flexible cables, etc.
Flat brush	For applying grease.

Special Tools (Part No.)	Remarks
Grease MOLYKOTE PG-641 (CK-0562-000)	To be applied on the specified parts (see *page 2-9*).
Spur Cleaner (QY9-0055-000)	For cleaning the spurs (see *page 2-10*).

2.2 Cautions for Disassembly and Reassembly

2.2.1 Cautions for ink stains (ink path/ink mist)

During servicing, be careful not to touch the ink path and get ink stains on the printer, work table, and your hands and clothing.
The ink path includes the BJ cartridge's ink cartridge supply inlet, the BJ cartridge's ink filter, the ink nozzles and maintenance jet receptacle, head cap, wiper, and waste ink absorber.

CAUTION

Although the ink does not contain anything harmful to humans, it does contain organic solvents.

Black ink: Glycerin 56-81-5, ethylene glycol 107-21-1, isopropyl alcohol 107-21-1
Color ink: Isopropyl alcohol 67-63-0
Photo ink: Glycerin 56-81-5, ethylene glycol 107-21-1, isopropyl alcohol 67-63-0

Be careful not to get the ink in your mouth or eyes.
If ink gets into your eyes, wash with lots of water and see a doctor. If you consume a large amount of ink orally, see a doctor promptly.
Since the ink contains dyes, it will permanently stain clothing and other materials.

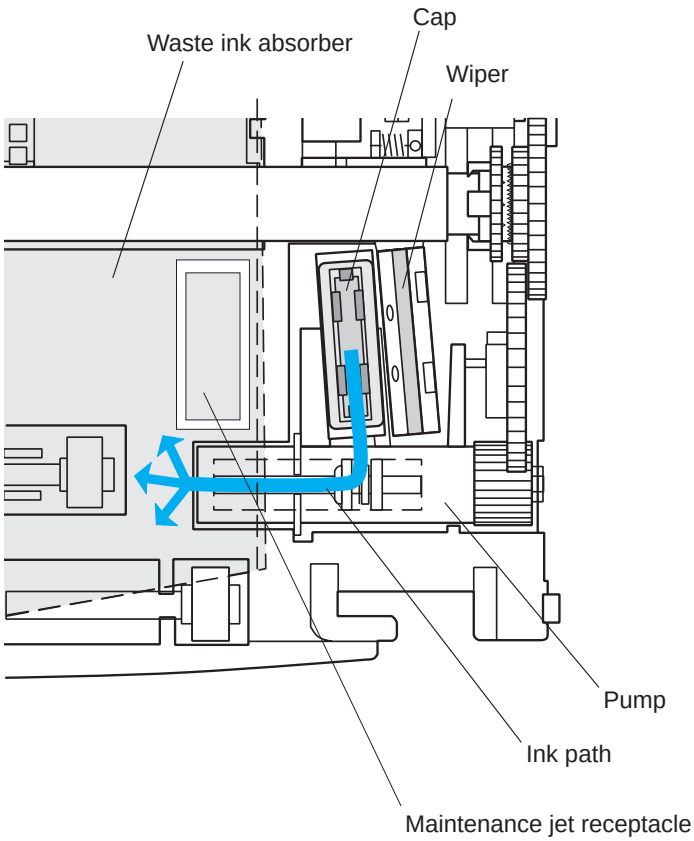

Figure 2-1 Ink Path

The BJ cartridge ejects ink onto the paper to print. After a long period of time or heavy-duty use, ink mist created by loose ink droplets and ink bouncing off by the paper will soil the platen, inside the cartridge cover, and around the purge section. These soiled parts can soil the paper and your hands and clothing. To prevent this, use a soft, damp cloth to wipe these parts clean.

CAUTION

When cleaning the purge section, be careful not to touch the cap or wiper section.

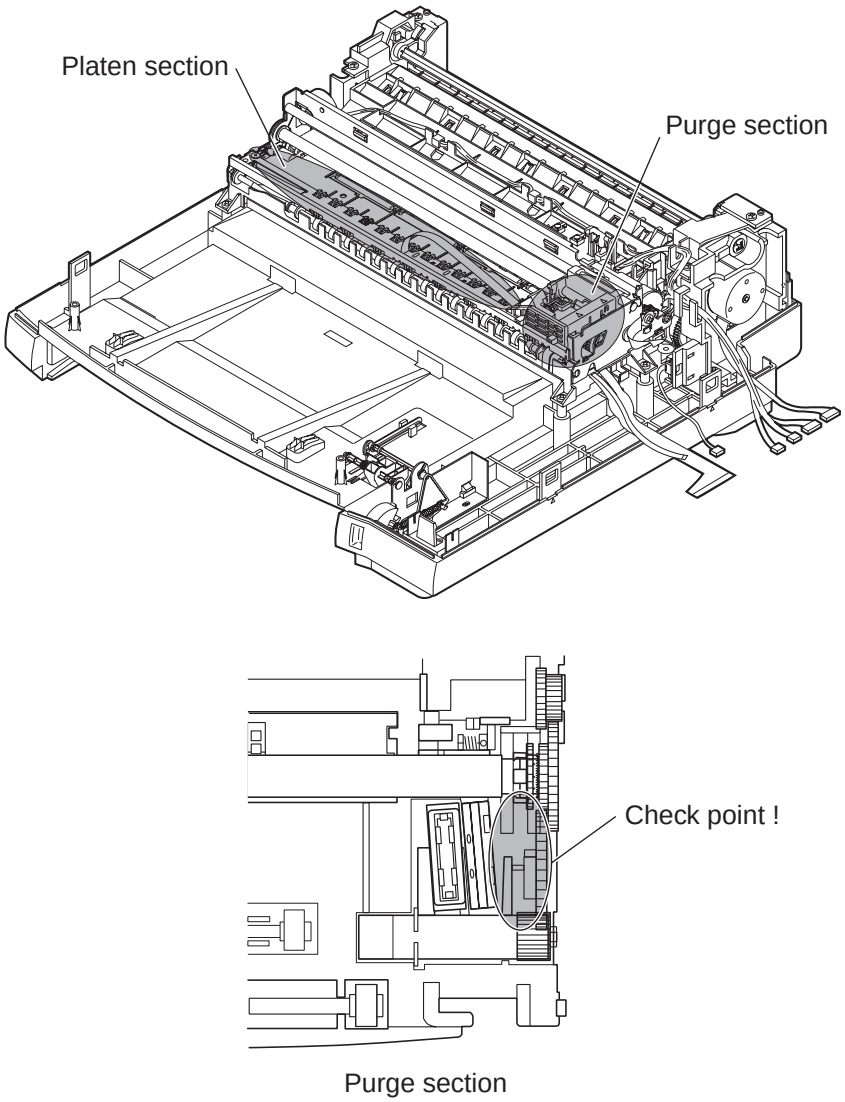

Figure 2-2 Parts Exposed to Ink Mist

2.2.2 Damage by static electricity

Due to the rubbing of clothing, static electricity can build up within the human body. Static electricity can damage electrical components or alter the electrical characteristics of components.
Never touch the contacts on the carriage and the BJ cartridge.
Handle the control board, sensor board or operation panel board with care not to break them by static electricity.

2.2.3 Preparation for transportation

While moving or transporting the printer, either leave the BJ cartridge in the printer or keep it in the storage box. This is to prevent the ink from leaking and the BJ cartridge's ink nozzles from drying up.

(1) Carrying the printer

Before carrying the printer while the BJ cartridge is still installed, follow the procedure below.

1) Turn off the printer by pressing the *POWER* button.

2) Check that the BJ cartridge is at the capping position (right end of printer). If it is not at the capping position, turn the printer on and off by the *POWER* button so that the carriage is moved to the capping position.

3) Disconnect the interface cable.

4) Disconnect the AC adapter's DC plug from the printer.
Disconnect the AC adapter's AC plug from the power outlet.

If you turn off the power by disconnecting the AC adapter or if you carry or transport the BJ cartridge without putting it in the storage box, ink may leak and the nozzles may dry up.

(2) Transporting the printer

Before transporting the printer, follow the procedure below.

1) Follow the procedure above for *"(1) Carrying the printer"* to turn off the printer and disconnect the interface cable and AC adapter.
2) Pack the printer and AC adapter in their original packaging.

If you do not have the original packaging, use enough shock-absorbing material to pack the printer.

2.3 Disassembly and Reassembly

Cautions for disassembling and reassembling the printer are stated below.
As for the disassembly procedure, refer to the *Parts Catalog*. The illustrations in the *Parts Catalog* are numbered according to the order of disassembly.

2.3.1 Removing plastic parts

The printer has many plastic parts. When disassembling the printer, be careful not to break or bend the plastic hooks. For details on disassembly and reassembly, refer to the *Parts Catalog*.

Some plastic parts contain glass fiber to improve the rigidity for better precision. Since these parts are less flexible, their plastic hooks are especially easy to break. During disassembly, do not exert excessive force on plastic parts with a screwdriver or other instrument.

2.3.2 Removing and installing tap screws

The printer uses tap screws to fasten the upper and bottom cases, the control board and bottom case, the pick-up unit and bottom case unit, and the chassis platen unit and bottom case. The removed tap screws will have residue from the mold in which the internal thread was made. Since the residue may crush the screw threads, clean off the residue from the tap screws before re-installing or use new tap screws.

2.3.3 Cable positions

Lay the cables connecting the motors, sensors, and control board according to the stipulated position.
For positioning the cables, refer to the *Parts Catalog*.

2.3.4 Deformation of spur tips

Be careful not to deform the spur tips.
The spur contacts the paper after the printing.
If the spur's tips are deformed, the contact area with the paper will become larger, increasing the amount of ink on the paper transferring onto the spur tips which will soil paper with dotted lines.

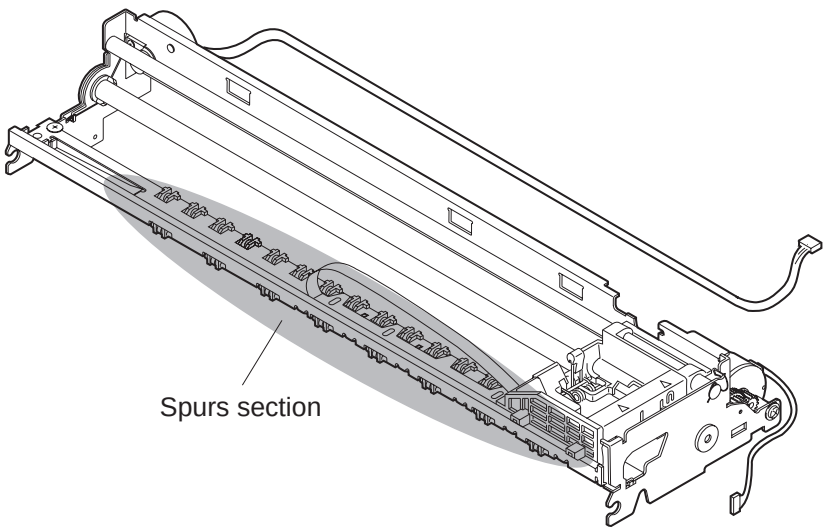

Figure 2-3 Spurs

2.3.5 Feed gear cautions

When disassembling or reassembling the printer, do not touch the gears of the at paper feeding section. Note that even a slight scratch on the gears will cause irregular paper feeding during high-quality printing.

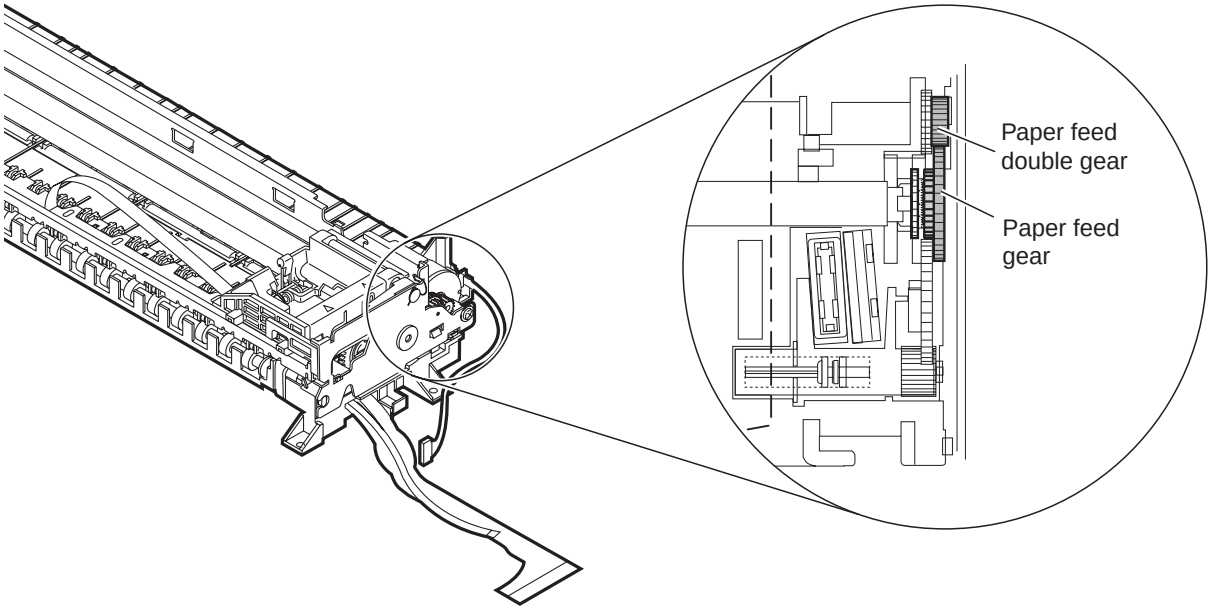

Figure 2-4 Feed Gear Cautions

2.3.6 Installing and removing the upper case unit

Before installing or removing the upper case unit, the paper delivery tray must be removed.

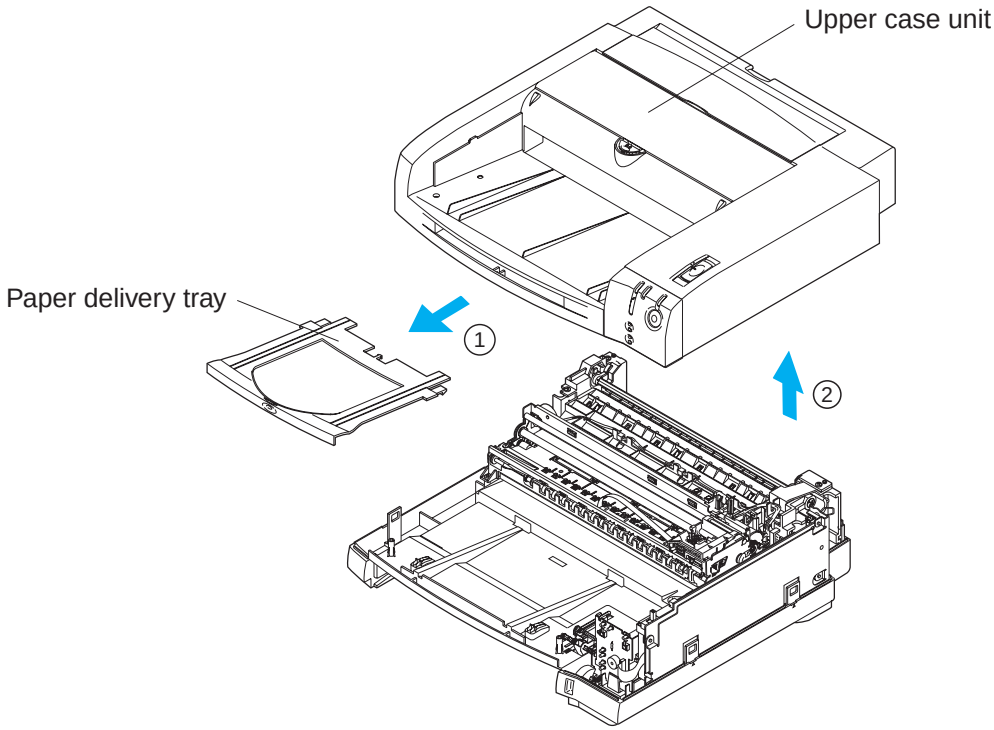

Figure 2-5 Installing and Removing the Upper Case Unit

2.3.7 Positioning the MODE switch

The position of the MODE switch on the upper cover must match the switch on the control board. Otherwise, the cover cannot be attached properly.

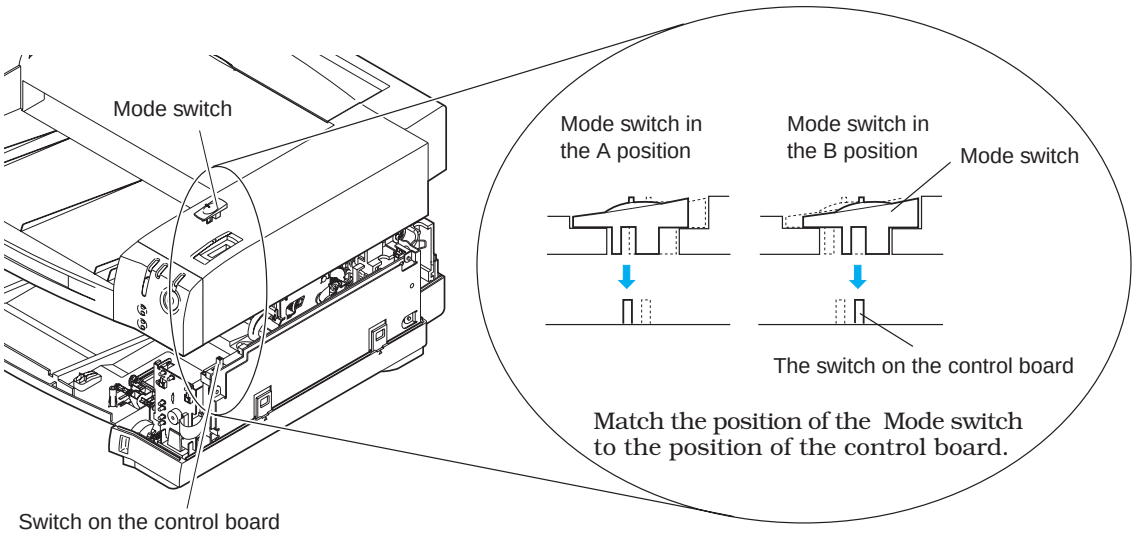

Figure 2-6 MODE Switch Positioning

2.3.8 Installing and removing the home position sensor

The home position sensor cannot be installed or removed when the carriage is at the home position. Move the carriage away from the home position before installing or removing the home position sensor.

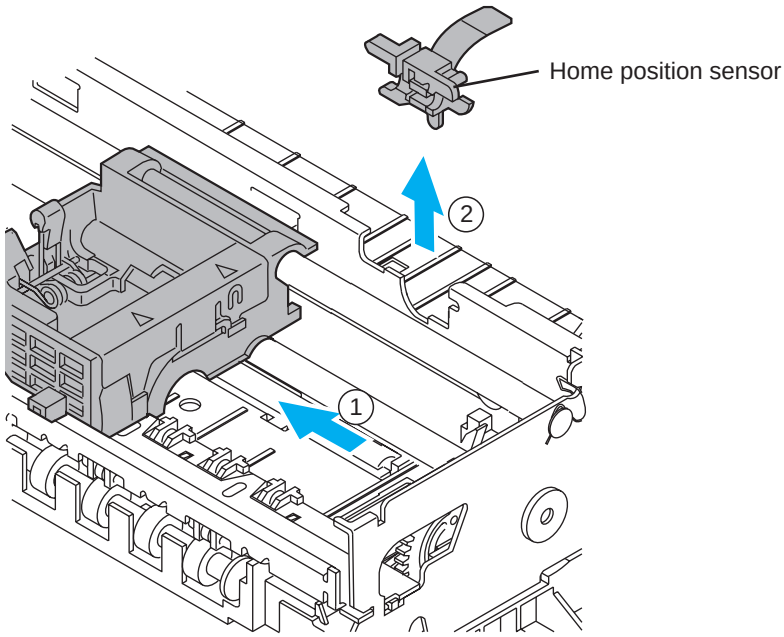

Figure 2-7 Installing and Removing the Home Position Sensor

2.4 Applying Grease

The places where grease is applied are shown below.
Only one type of grease is to be used: PG-641 (CK-0562).
Use a flat brush to apply grease thinly and evenly.
To disassemble and assemble the printer, refer to the *Parts Catalog*.

CAUTION

When applying grease, be careful not to get any grease on the wiper and cap.

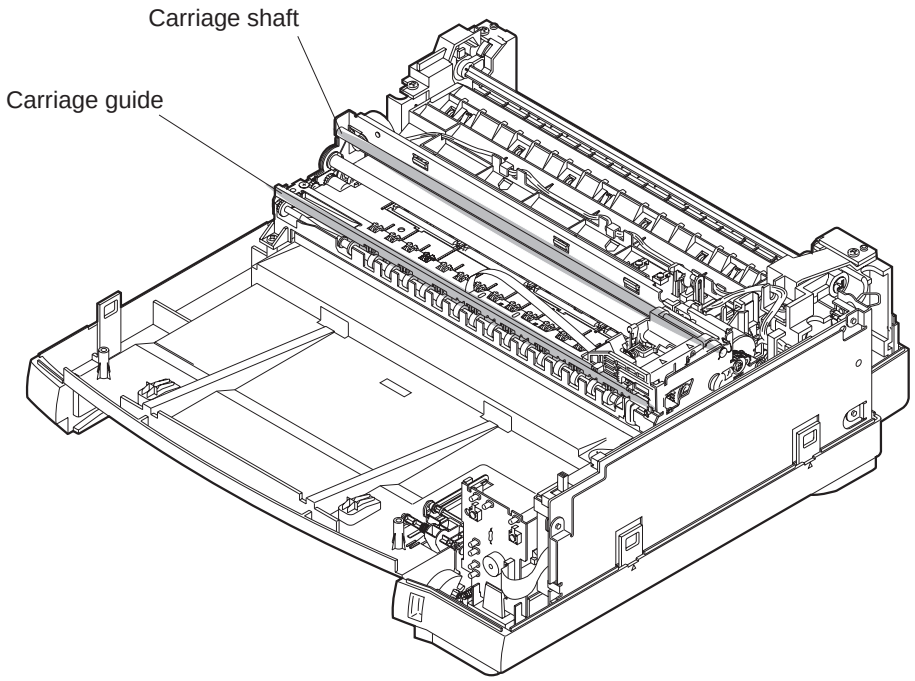

Figure 2-8 Applying Grease

2.5 Adjustments and Settings After Disassembly and Reassembly

2.5.1 Adjustments

(1) User Level

None.

(2) Service personnel Level

Timing	Adjustment	Time Required	Tools Required
After control board replacement	EEPROM setting*	2 min.	None
After printer base unit replacement	EEPROM clear*	2 min.	None

* To clear and set the EEPROM, refer to *"Part 3: 2.1 Service Mode Operations" on page 3-10*.

2.6. Spur Cleaner

If the tips of spurs become dirty with ink, spur marks can be left on the print images. In such case, clean the spurs by using the spur cleaner (QY9-0055-000). The spur cleaner can be used until it loses its intended effect.

2.6.1 Usage

1) Moisten the fabric part of the spur cleaner with approx. 5 cc of water.
   Moisten the fabric with water, as shown below, so that the fabric absorbs enough water from end to end, especially the areas that will contact the spurs.
   Be careful not to moisten the fabric with too much water. In case too much water is used, there is a possibility that water will be squeezed from the spur cleaner when passing through the paper feed roller, spread inside the printer, and cause failure.

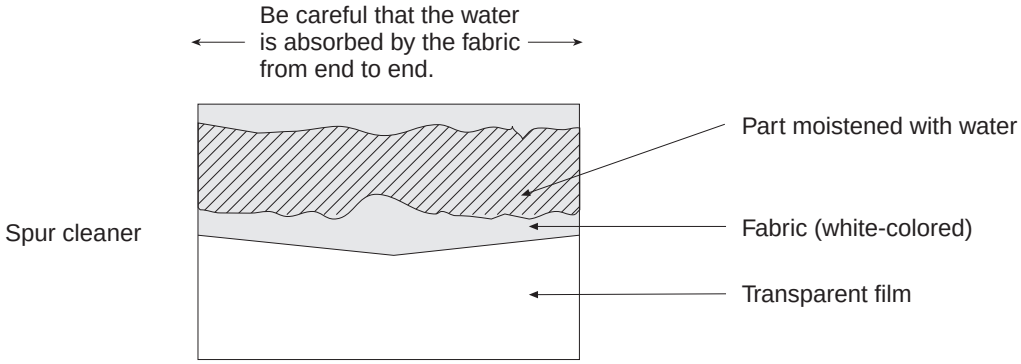

Figure 2-9 Spur Cleaner

2) Turn the power on.
3) Set the spur cleaner.
   Open the manual feed tray and set the spur cleaner with the fabric-affixed part of the cleaner face-up and to the top.
   The spur cleaner is fed and stops at the print start position.

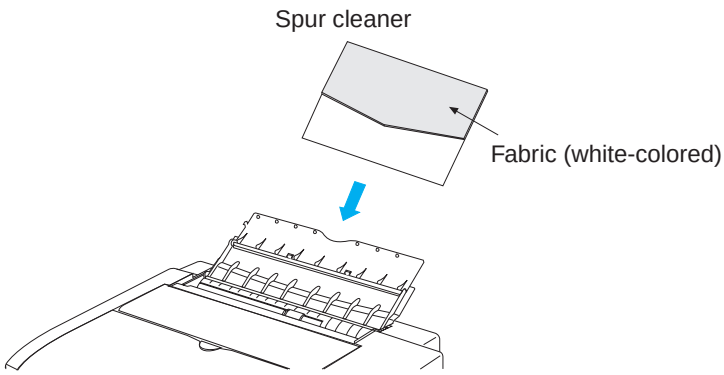

Figure 2-10 Set the Spur Cleaner

4) Feed the spur cleaner.
   Press the *RESUME* button, and release it after the beeper sounds once. The spur cleaner is delivered.
5) Repeat procedures 3) and 4) approx. 5 times in case of heavy soiling.
6) Remove the moisture remaining in the paper feeding path.
   With a single sheet of plain paper set in the manual feed tray, repeat procedure 4) several times until the water is completely removed from the paper path.

3. OPERATION CHECK AFTER DISASSEMBLY AND ASSEMBLY

3.1 Check Procedure

After disassembly and reassembly, follow the procedure below to check the printer's operation.

1) After repairs

Check that the printer can print out the EEPROM data properly. For the procedure, see *"Part 3: 2.1 Service Mode Operations" on page 3-10*.

2) After replacing the control board and printer base unit

After replacing the control board and printer base unit, check the following:

After control board replacement	The ROM version in the list of EEPROM data must be the correct one. In the list of EEPROM data, the total waste ink amount must be about the same percentage as in the waste ink absorber. The nozzle check pattern must be able to be printed from the printer driver.
After printer base unit replacement	In the list of EEPROM data, the total waste ink amount must be cleared to 0%.

*1: To print out the list of EEPROM settings, see *"Part 3: 2.1 Service Mode Operations" on page 3-10*.

*2: To set or clear the total waste ink amount, see *"Part 3: 2.1 Service Mode Operations" on page 3-10*.

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Part 3

OPERATION

1. PRINTER OPERATION FUNCTIONS

The printer's operation functions include status indications and printer control via a personal computer or via the printer's operation panel and operation from the printer itself.

1.1 Status Indications

The printer has indicators to indicate the printer status.
The printer indicates an error with a green *POWER* indicator, a green *BUSY* indicator, an orange *ERROR* indicator, and a certain number of beeper sounds.
The remaining ink amount is indicated by the *INK-LOW* indicator.

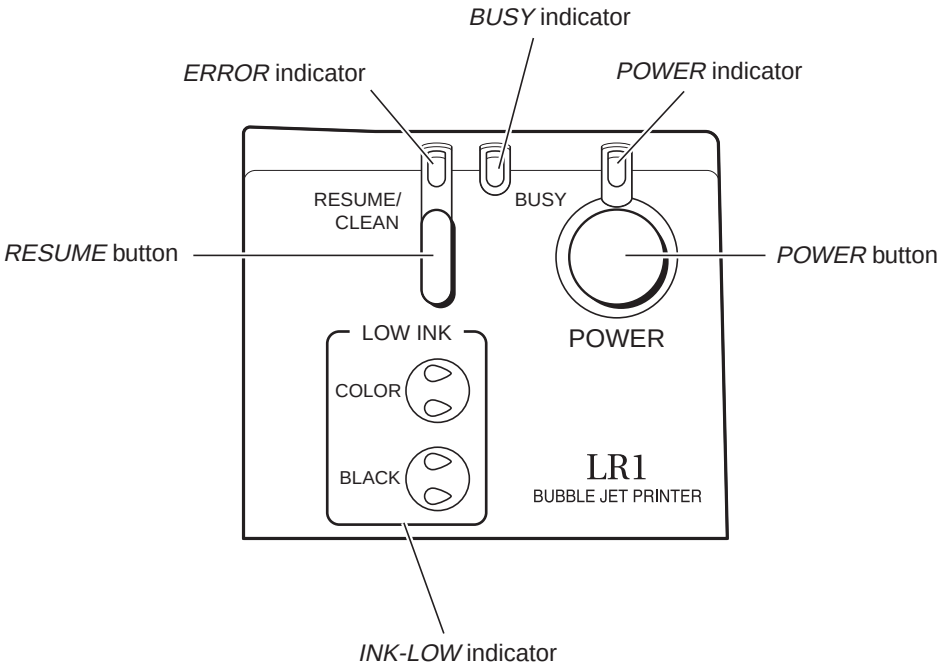

Figure 3-1 Operation Panel

1.1.1 Status indicators

1) Normal Status

Refer to the following *"Table 3-1 STATUS INDICATORS"*.

Table 3-1 STATUS INDICATORS

Indicator State			Status
Power (Green)	Busy (Green)	Error (Orange)	
On	Off	Off	During power on.
On	Blinking	Off	During initialization and busy, cartridge replacement, cleaning operation, and cartridge cover open.
On	On	Off	During printing.
Off	Off	Off	During power on and standby.

2) Error Status

2-1) Error display for user-recoverable errors

When a user-resolvable error occurs, the *ERROR* indicator either turns on or blinks and the beeper sounds a certain number of times. By closing the cartridge cover and pressing the *RESUME* button, the beeper sounds a certain number of times to indicate which error has occurred and the error is canceled.

2-2) Error display for user-unrecoverable errors

When a user-unrecoverable error occurs, the *POWER* indicator, *BUSY* indicator, or *ERROR* indicator blinks and the beeper sounds a certain number of times to indicate which error has occurred.

Status	Power	Busy	Error	Beeper Sounds	Page
User-recoverable errors					
Paper-feed error	On	Off	On	1	Page 4-11
Paper jam error	On	Off	On	2	Page 4-11
Cartridge not-loaded error	On	Off	On	3	Page 4-13
Cartridge mismatch error	On	Off	On	4	Page 4-13
Failed manual feed warning	On	Off	Blinking	1	Page 4-10
Cartridge replacement auto-completion warning	On	Off	Blinking	3	Page 4-15
Cartridge overheating warning	On	Off	Blinking	4	Page 4-8
Waste ink full warning	On	Off*	Blinking	5	Page 4-5
User-unrecoverable errors					
ROM error	Blinking	Blinking	Blinking	1	Page 4-5
RAM error	Blinking	Blinking	Blinking	2	Page 4-5
No-cartridge error	Blinking	Blinking	Blinking	3	Page 4-13
Home position error	Blinking	Blinking	Blinking	4	Page 4-6
Waste ink full error	Blinking	Blinking	Blinking	5	Page 4-5
Internal temperature sensor error	Blinking	Blinking	Blinking	6	Page 4-5
Automatic correction error	Blinking	Blinking	Blinking	7	Page 4-6
Head overheating error	Blinking	Blinking	Blinking	8	Page 4-8
EEPROM error	Blinking	Blinking	Blinking	11	Page 4-5

* The *BUSY* indicator turns on when there is receiving data.

1.1.2 Error description

User-recoverable errors

1) Paper-feed error
The paper is not fed during the paper-feed operation.

2) Paper jam error
The paper cannot be delivered even when the paper delivery operation is executed for 584.2 mm (23 inches).

3) Cartridge not-loaded error
The cartridge is not loaded in the printer.

4) Cartridge mismatch error
The data sent by the personal computer does not match the installed cartridge. Open the cartridge cover and install the correct cartridge. The error will then be canceled. Pressing the *POWER* button to turn the printer on/off will also cancel the error.

5) Failed manual feed warning
The paper cannot be fed manually with the manual feed tray.

6) Cartridge replacement auto-completion warning
The cartridge replacement mode has been disabled by the printer. Closing the cartridge cover cancels the error.

7) Cartridge overheating warning
The cartridge temperature is high and the cartridge cover is also open.

8) Waste ink full warning
The total waste ink amount recorded in the EEPROM is close to the full capacity (99% or higher).

User-unrecoverable errors

9) ROM error
The ROM check failed during initialization.

10) RAM error
The RAM check failed during initialization.

11) No-cartridge error
The printer is unable to detect the BJ cartridge at any position except at the cartridge replacement position.

12) Home position error
The home position sensor is not working (line disconnected).
The carriage's home position cannot be detected.

13) Waste ink full error
The total waste ink amount recorded in the EEPROM exceeds the full capacity (100%).

14) Internal temperature sensor error
The temperature sensor (TH1) on the control board has a malfunction (line disconnected).

15) Automatic correction error
The home position cannot be detected during printing position correction.

16) Head overheating error
The BJ cartridge temperature is abnormal.

17) EEPROM error
An error occurred during the writing to EEPROM.

1.1.3 Ink-low indicator

The printer has an *INK-LOW* indicator to display the remaining ink amount.

COLOR 	The BCI-18 Color still has ink.	BLACK 	The BCI-17 Black/BCI-18 Black still has ink.
COLOR 	The BCI-18 Color's remaining ink amount is half or less. The BCI-11 Color's/BCI-12 Color has little ink remaining.	BLACK 	The BCI-17 Black/BCI-18 Black's remaining ink amount is less than half. The BCI-10 Black/BCI-12 Black has little ink remaining.
COLOR 	BCI-18 Color has little ink remaining.	BLACK 	BCI-18 Black has little ink remaining.

: off : lit (Green)

No lamps lit: Enough ink remains.
One lamp lit: The large-capacity ink cartridges have less than half (equivalent to the amount in the standard ink cartridge) the full amount of ink.
The standard-capacity ink cartridges have little ink remaining.
Two lamps lit: The large-capacity ink cartridge has little ink remaining.

After replacing the ink cartridge, reset the dot counter. If the dot counter is not reset, the remaining ink amount detected will not be correct. To reset the dot counter, see *"1.3.3 Resetting the dot counter" on page 3-8*.

1.1.4 BJ status monitor (Used only when connected to a computer)

The BJ status monitor indicates the printer's status and printer progress. It can also cancel the printing.
The BJ status monitor can be used only when it is connected to a personal computer. It cannot be used when it is connected to a set top box.

(1) BJ status monitor features

1) Displays the printer's status and printing progress in real-time with diagrams and messages.
2) When an error occurs, the error type and solutions are displayed.
3) The type of BJ cartridge installed and ink-low warning are displayed as text and icons.
4) The current printing operation can be canceled.

(2) BJ status monitor display items

1) Printer name
2) Document name
3) Status: When an error occurs, the error code and solutions are displayed.
4) Start date and time
5) Progress
6) Printed page count
7) Printing canceled
8) Installed cartridge: Cartridge type indicated by an icon.
9) Ink-low warning: The remaining amount of ink for each ink cartridge is displayed as an icon.

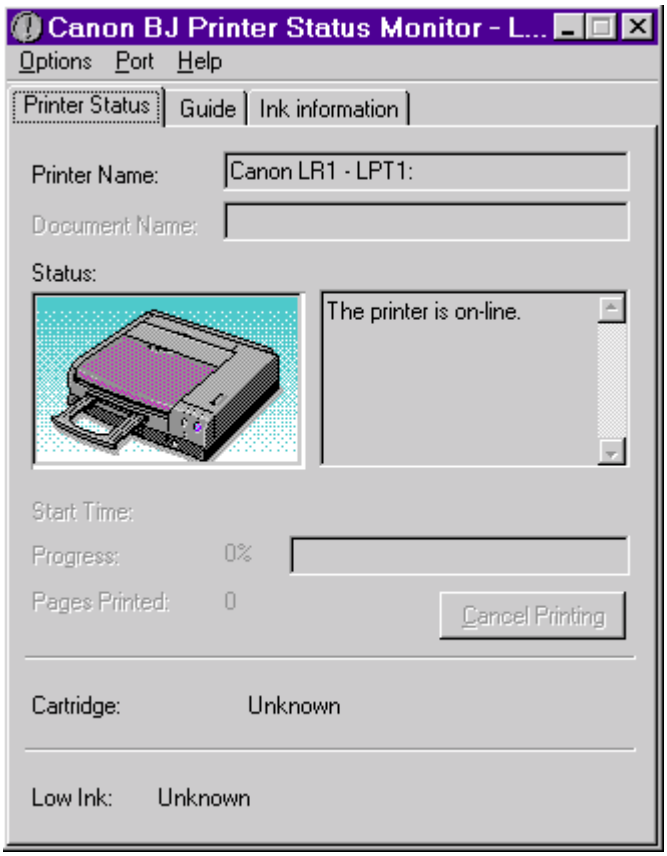

Figure 3-2 BJ Status Monitor (Sample)

1.2 Operation With a Computer

When the printer is connected to a personal computer, the printer's functions can be set with the exclusive printer driver. The exclusive printer driver cannot be used when the printer is connected to a set top box.

1.2.1 Function settings with the printer driver

The following utility items can be set or executed with the exclusive printer driver.

1) Cleaning
2) Head refreshing
3) Pick-up roller cleaning
   To clean the pick-up roller, feed one cleaning sheet in the cassette to the rear of the printer. This cleans the paper bits adhering to the pick-up roller.
   To clean the pick-up roller, open the rear cover. The cleaning sheet will be delivered from the rear of the printer.
4) Printing the demo pattern
5) Printing the nozzle check pattern
6) Printer power off
7) Automatic power on/off function setting
8) Status monitor startup

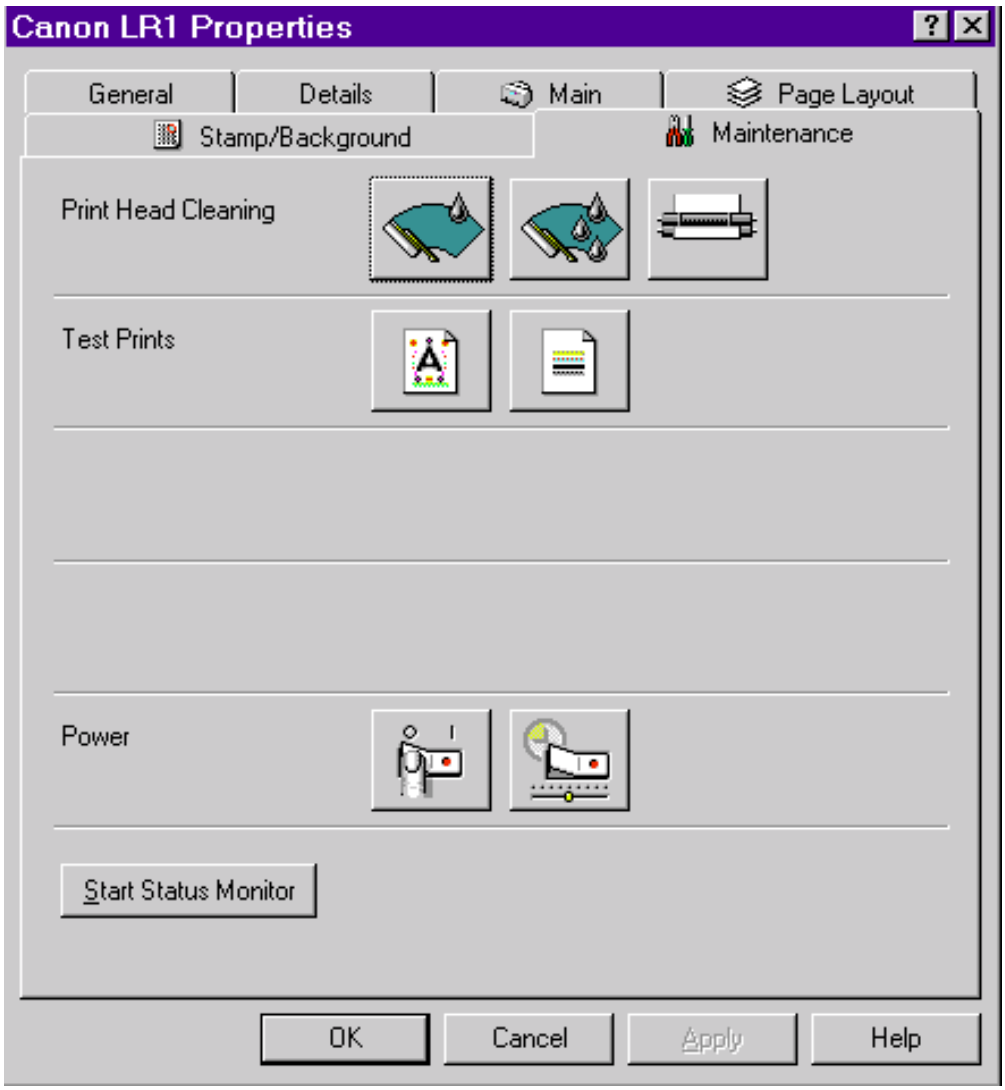

Figure 3-3 Printer Driver Utilities (Sample)

1.3 Operation From the Printer Itself

The printer has a *POWER* button, *RESUME* button, MODE switch, and *DOT COUNTER RESET* button.

These printer controls enable "offline operation" while the printer is not connected to a computer or STB.

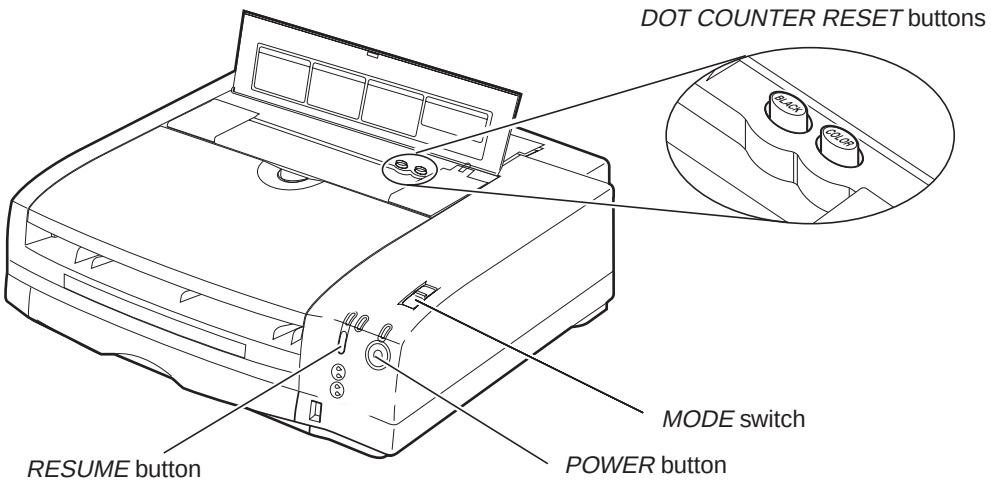

Figure 3-4 Printer Buttons

1.3.1 Cleaning and head refreshing

While the power is on, hold down the *RESUME* button and release after the beeper sounds the stipulated number of times. The cleaning will then start. Cleaning can also be executed from the printer driver's utility while the printer is connected to a computer.

Operation	Beeper Sounds
Cleaning	2 times
Head refreshing	3 times

1.3.2 Printing the nozzle check pattern

With the printer off, hold down the *POWER* button and release after the beeper sounds four times. The nozzle check pattern will then start printing. If any printing defects show up in this printout, excute the BJ cartridge cleaning. If the printing defect still persists after cleaning the BJ cartridge or refreshing the head five times or more, replace the BJ cartridge.

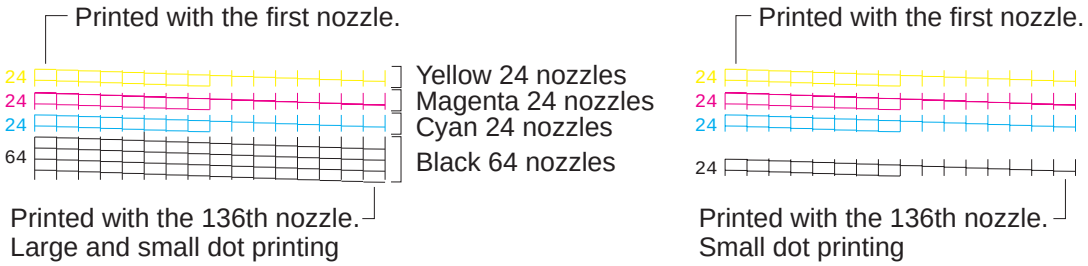

Figure 3-5 Printing the Nozzle Check Pattern (Sample BC-11e)

If possible, print out the nozzle check pattern with paper fed from the cassette.
If you must feed the paper manually to print out the nozzle check pattern, follow the procedure below:

1) Without setting any paper in the manual-feed slot, and the paper cassette try to print out the nozzle check pattern. A paper-feed error will occur.
2) Insert one sheet of paper into the manual-feed slot, then press the *RESUME* button. The paper-feed error will be canceled and the nozzle check pattern will be printed.

1.3.3 Resetting the dot counter

After replacing the ink cartridge or BJ cartridge with a new cartridge, follow the procedure below to reset the dot counter.

1) Open the cartridge cover. The cartridge will move to the center.
2) Check that the ink cartridge whose dot counter is to be reset is installed. (The dot counter reset will be enabled only for the cartridge installed.)
3) When resetting the dot counter for the black ink cartridge, press the *"BLACK" COUNTER RESET* button. To reset the dot counter for a color ink cartridge, hold down the *"COLOR"* button and release when the beeper sounds.

After replacing the ink cartridge or BJ cartridge to a new one, be sure to reset the dot counter. If the dot counter is reset without the ink cartridge being replaced or if the dot counter is not reset after the cartridge is replaced, the remaining ink amount detected will not be correct.

1.3.4 Cleaning the pick-up roller

When dust and paper bits adhere to the pick-up roller, the paper feeding becomes less efficient. In such a case, use a cleaning sheet to clean the pick-up roller as described below.

Use the exclusive cleaning sheet included in the pack of high-resolution paper.

1) Put the cleaning sheet in the paper cassette.
   Peel off the cleaning sheet's backing. Lay the sheet with the sticky side facing up. Set the sticky side toward the claw.
2) Open the rear cover.
3) Hold down the *RESUME* button and release it when the beeper sounds once.
   The cleaning sheet will be fed into the printer and discharged out the back of the printer. The error indicator will light.
4) Take out the cleaning sheet and close the rear cover. Press the *RESUME* button.

You can also clean the pick-up roller with the printer driver if the printer is connected to a personal computer. See *1.2.1 Function settings with the printer driver on page 3-6*.

1.3.5 Auto power on/off setting

The printer has an auto power on/off feature.

Upon factory shipment, the printer is set as follows:

Auto power on: Enabled
Auto power off: Enabled, 30 min.

To disable the auto power on/off, hold down the *POWER* button and release after the beeper sounds the stipulated number of times.

Setting	Beeper Sounds
Auto power on: Disabled	12 times
Auto power off: Disabled	13 times

To enable the auto power on/off again, set the function back to the factory setting. With the power off, hold down the *POWER* button and release after the beeper sounds seven times. The function will then be returned to the factory shipment setting. Note that this will also return all other items in the function setting table to the factory shipment setting.

The auto power on/off setting can also be changed with the printer driver's utility while the printer is connected to a personal computer.

NOTE

The function settings upon factory shipment are shown below.

Paper Selection	Test Scale	Top Margin	Print Mode
LTR	Disable	8.5mm	HQ
Smoothing	Reduction	Auto Power On	Auto Power Off
Disable	1/1	Enable	Enable (30 min.)
Font	Font Lock	Input/Download Buffer	Automatic Line Feed
Roman	Disable	64/23KB	CR=CR
Internal Character Set	Character Set	Code Page	Low Ink Alert
USA	Italic	PC437	Enable

1.3.6 Mode switch

If the STB connected to the printer has a mode selection switch, you can choose the mode by the *MODE* switch. The *MODE* switch is not used when the printer is connected to a computer.

2. SERVICE-RELATED FUNCTION

The printer has a service mode to access service settings and to execute a test printout.

2.1 Service Mode Operations

1) Disconnect the cable of AC adapter from the printer power connector. Open the cartridge cover.
2) While holding down the *COLOR DOT COUNTER RESET* button and the *BLACK DOT COUNTER RESET* button and insert the AC adapter's DC plug into the printer.
3) While holding down the *COLOR DOT COUNTER RESET* button and the *BLACK DOT COUNTER RESET* button, press the *POWER* button and release the buttons after the beeper sounds once.
4) Press the *COLOR DOT COUNTER RESET* button the number of times indicated below to select the function to be executed.
Each time you press the button, the beeper will sound and the indicator will change to orange or green.

Times	Indicator	Function
7	Busy (Green)	EEPROM reset
13	Busy (Green)	EEPROM data printout
14	Error (Orange)	Waste ink absorber capacity setting: 25%
15	Busy (Green)	Waste ink absorber capacity setting: 50%
16	Error (Orange)	Waste ink absorber capacity setting: 75%

5) After making the selection, press the *BLACK DOT COUNTER RESET* button. The beeper sounds once and the functions will be executed.

The service mode can be set only when the cartridge cover is open. The cover sensor detects whether the cartridge cover is open or not.
When the cover sensor lever is up, the cover is detected as closed.
When the cover sensor lever is down, the cover is detected as open.
When you take off the upper case or cartridge cover, the cover sensor lever will be up. In that case, do step 2 above while pushing down the cover sensor lever.

2.2 Printing the EEPROM Data

The EEPROM records various data such as the settings, total page count of each BJ cartridge, total waste ink absorption amount, and the dot counter for each ink cartridge. The data in EEPROM serves as a general guide to how much the printer has been used.

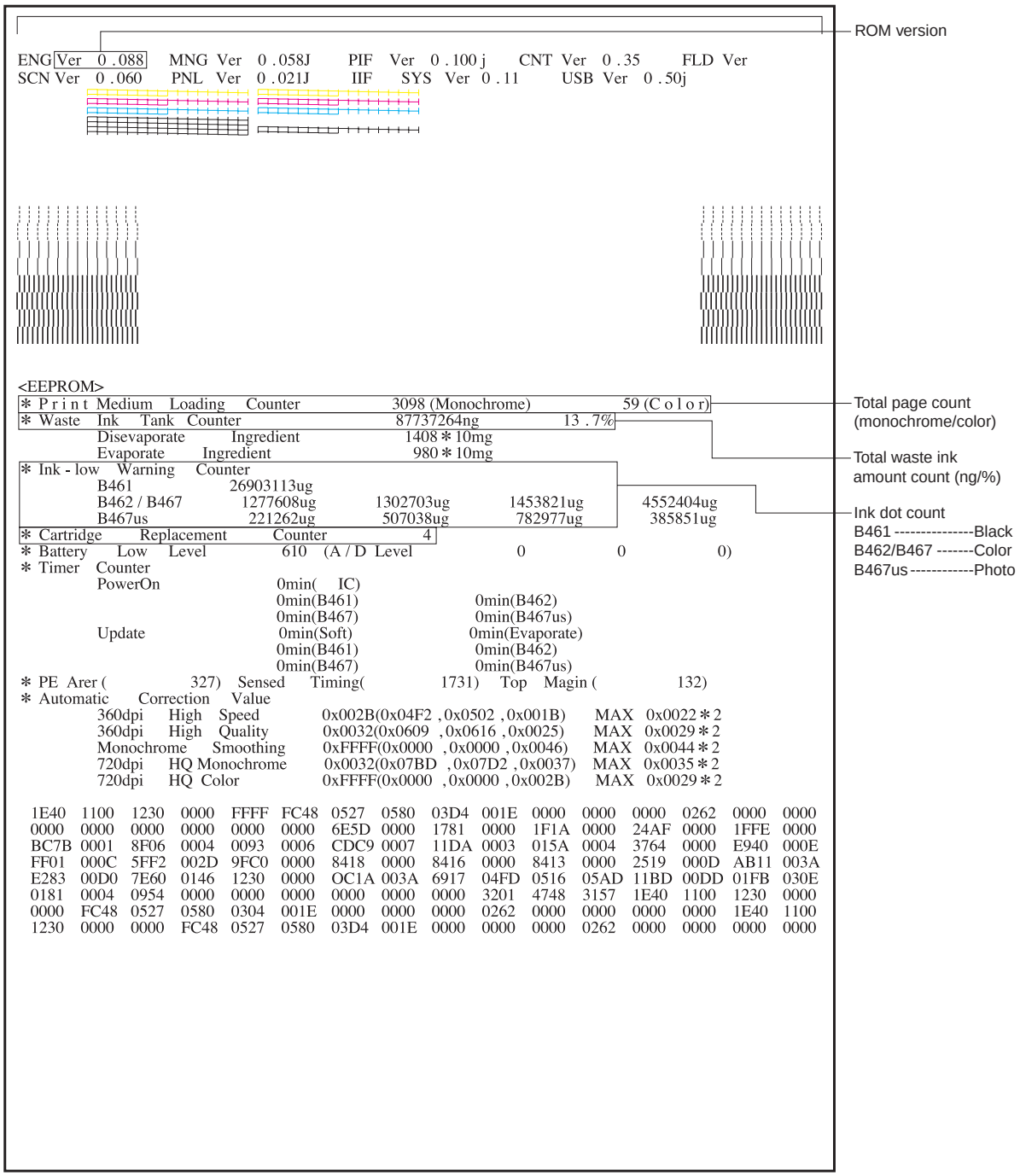

Figure 3-6 EEPROM Data Printout (sample)

2.3 Setting the Waste Ink Amount

The printer detects "waste ink full" based on the total waste ink absorption amount recorded in the EEPROM. Thus, after you replace the waste ink absorber, you must also reset the total waste ink absorption amount.
Also, after replacing the control board, you must reset the new control board's EEPROM and set the waste ink absorption amount for the waste ink absorber installed in the printer base unit.

1) After replacing the control board

Before replacing the control board, visually check the waste ink absorption amount in the waste ink absorber in the printer base unit.
After replacing the control board, set the waste ink absorption amount you found out visually to the EEPROM.

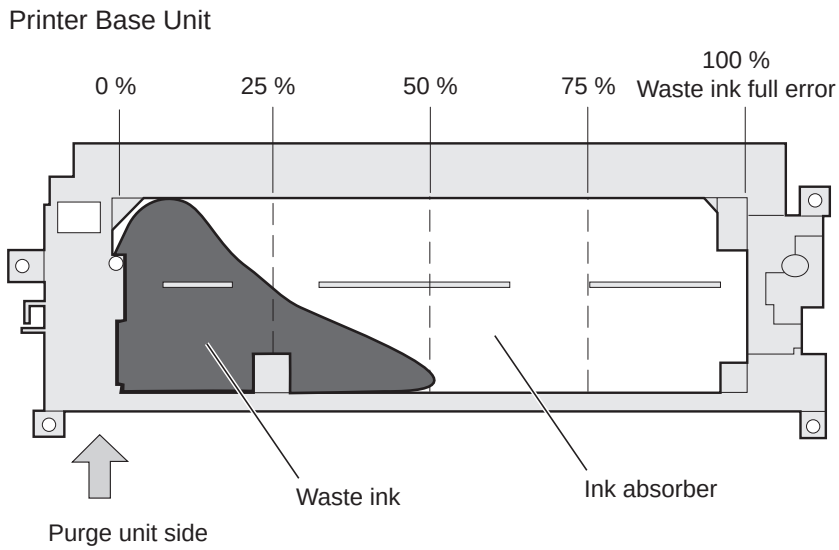

Figure 3-7 Waste Ink Absorber (50% of capacity)

2) After replacing the printer base unit (waste ink absorber)

After replacing the printer base unit, set 0% as the waste ink absorption amount to the EEPROM (EEPROM reset).

The EEPROM contains various data such as the settings, total page count for each BJ cartridge, total waste ink absorption amount, and the dot counter for each ink cartridge. When the EEPROM is reset, all those data will be reset as well.

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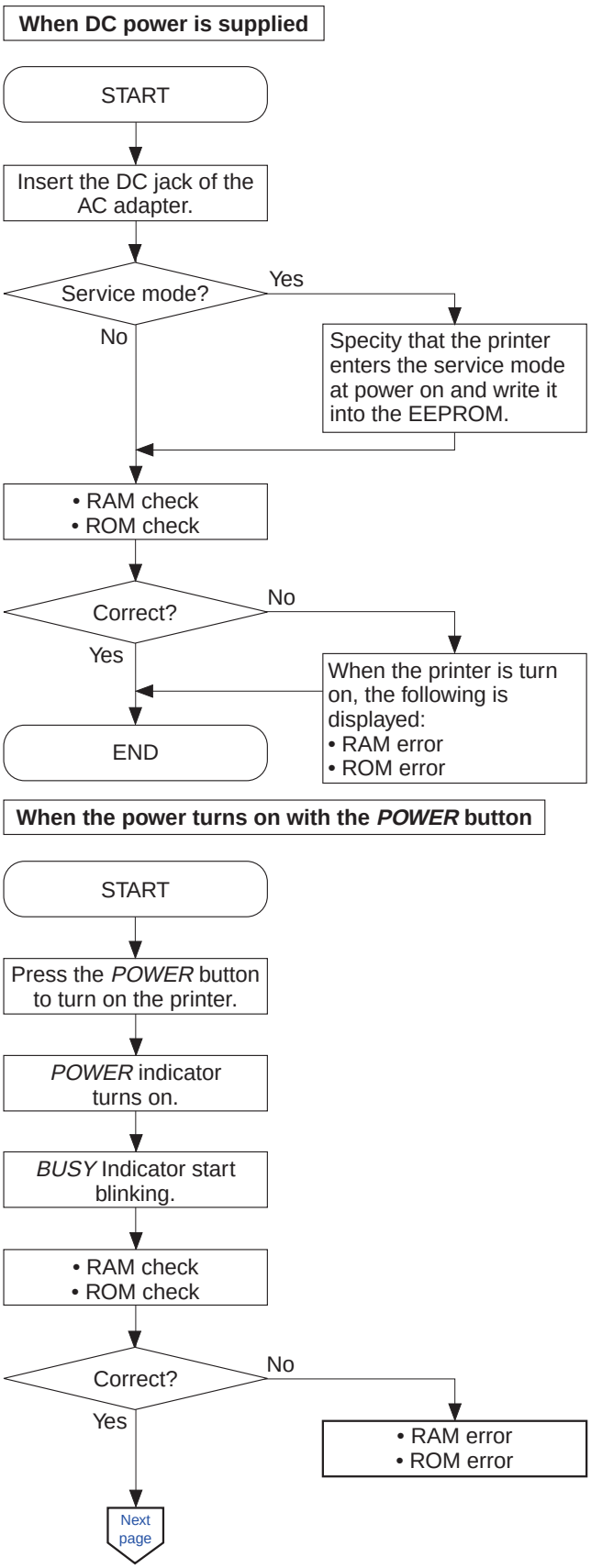
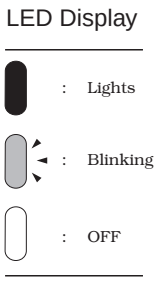
Part 4

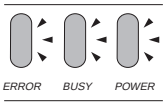
TROUBLESHOOTING

1. TROUBLESHOOTING ACCORDING TO ERROR DISPLAY

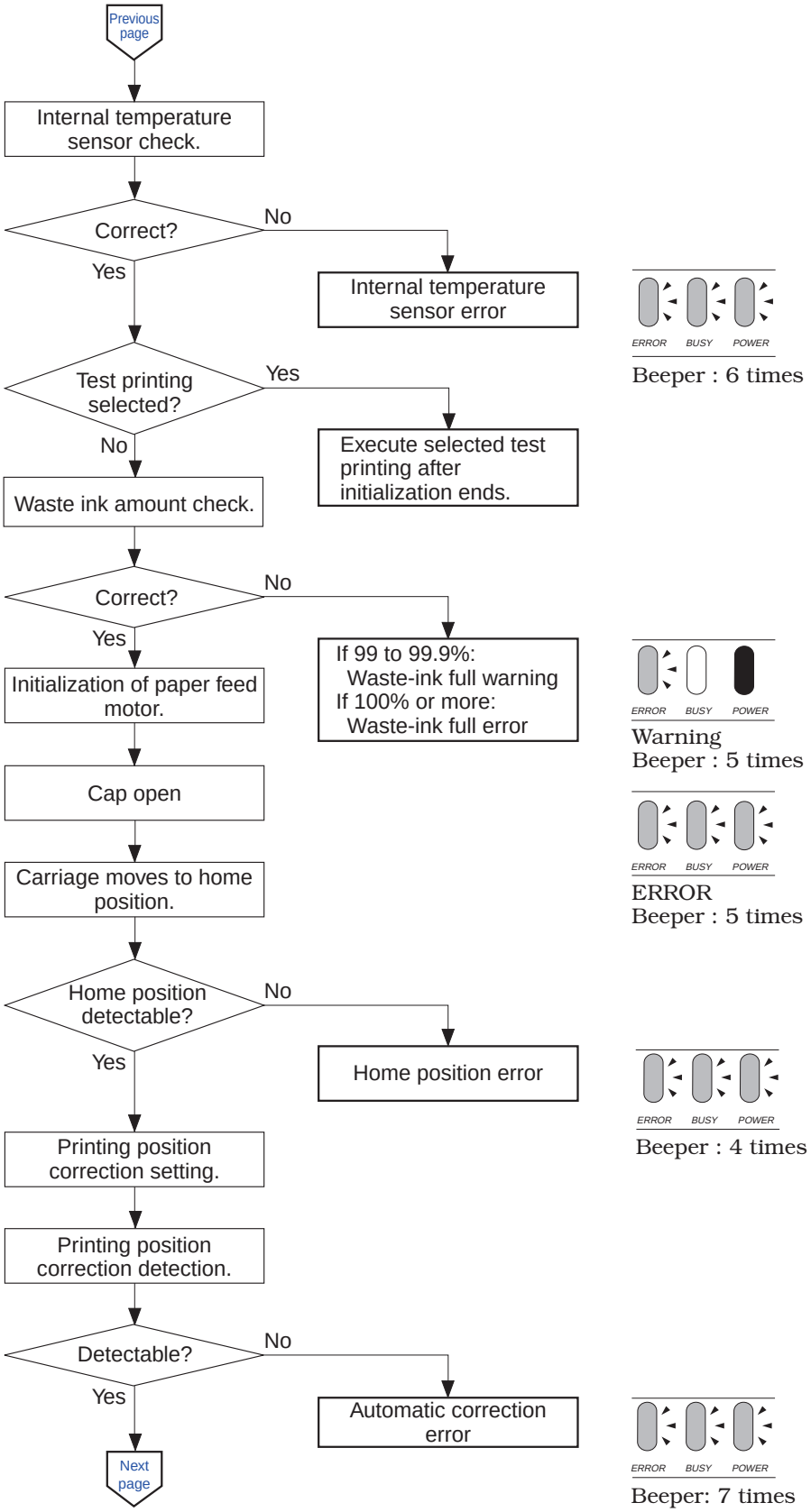
1.1 Initial Flow Chart

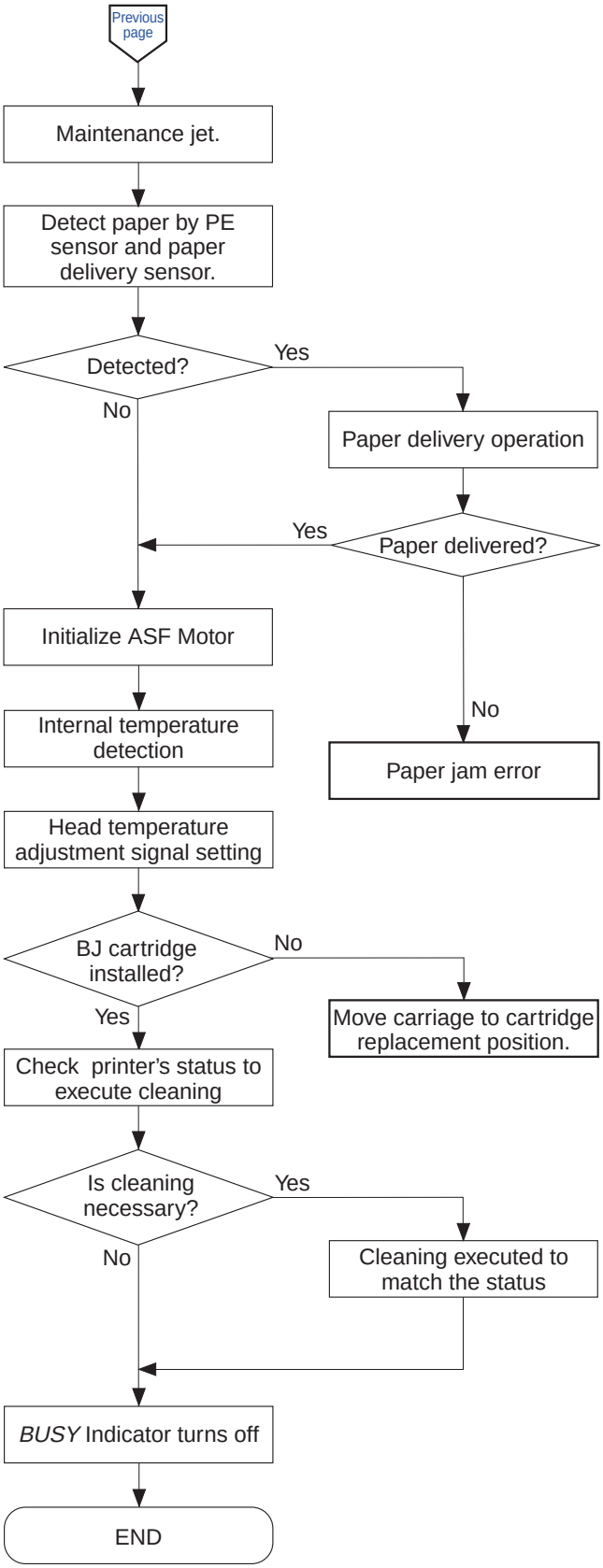


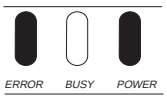




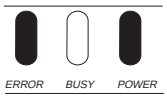
RAM error: 2 beeps
ROM error: 1 beep


Previous page
Internal temperature sensor check.
Correct?
No
Yes
Internal temperature sensor error
ERROR BUSY POWER
Beeper : 6 times
Test printing selected?
Yes
No
Execute selected test printing after initialization ends.
Waste ink amount check.
Correct?
No
Yes
If 99 to 99.9%:
Waste-ink full warning
If 100% or more:
Waste-ink full error
ERROR BUSY POWER
Warning
Beeper : 5 times
Initialization of paper feed motor.
Cap open
Carriage moves to home position.
ERROR BUSY POWER
ERROR
Beeper : 5 times
Home position detectable?
No
Yes
Home position error
ERROR BUSY POWER
Beeper : 4 times
Printing position correction setting.
Printing position correction detection.
Detectable?
No
Yes
Automatic correction error
ERROR BUSY POWER
Beeper: 7 times
Next page





Beeper : 2 times



Beeper : 3 times

1.2 Error List

Error Status

1) Error display for user-recoverable errors

When a user-resolvable error occurs, the *ERROR* indicator either turns on or blinks and the beeper sounds a certain number of times. By closing the cartridge cover and pressing the *RESUME* button, the beeper sounds a certain number of times to indicate which error has occurred and the error is canceled.

2) Error display for user-unrecoverable errors

When a user-unrecoverable error occurs, the *POWER* indicator, *BUSY* indicator, and *ERROR* indicator blink and the beeper sounds a certain number of times to indicate which error has occurred.

Table 4-1 ERROR DISPLAY

Status	Power	Busy	Error	Beeper Sounds	Page
User-recoverable errors					
Paper-feed error	On	Off	On	1	Page 4-11
Paper jam error	On	Off	On	2	Page 4-11
Cartridge not-loaded error	On	Off	On	3	Page 4-13
Cartridge mismatch error	On	Off	On	4	Page 4-13
Failed manual feed warning	On	Off	Blinking	1	Page 4-10
Cartridge replacement auto-completion warning	On	Off	Blinking	3	Page 4-15
Cartridge overheating warning	On	Off	Blinking	4	Page 4-8
Waste ink full warning	On	Off*	Blinking	5	Page 4-5
User-unrecoverable errors					
ROM error	Blinking	Blinking	Blinking	1	Page 4-5
RAM error	Blinking	Blinking	Blinking	2	Page 4-5
No-cartridge error	Blinking	Blinking	Blinking	3	Page 4-13
Home position error	Blinking	Blinking	Blinking	4	Page 4-6
Waste ink full error	Blinking	Blinking	Blinking	5	Page 4-5
Internal temperature sensor error	Blinking	Blinking	Blinking	6	Page 4-5
Automatic correction error	Blinking	Blinking	Blinking	7	Page 4-6
Head overheating error	Blinking	Blinking	Blinking	8	Page 4-8
EEPROM error	Blinking	Blinking	Blinking	11	Page 4-5

* The *BUSY* indicator turns on when there is receiving data.

1.3 Troubleshooting Errors

1. ROM Error

<Cause> The contents in ROM could not be read during the initialization.
<Suspected parts> Control ROM.
<Measure> Replace the ROM or the control board.

2. RAM Error

<Cause> Reading and writing in RAM cannot be performed properly.
<Suspected parts> DRAM, MPU, and print controller.
<Measure> Replace the control board.

3. EEPROM Error

<Cause> Writing to EEPROM cannot be performed properly.
<Suspected parts> EEPRROM, MPU, and print controller.
<Measure> Replace the control board.

If ROM error or RAM error occurs, the error display might not always be accurate.

4. Internal Temperature Sensor Error

<Cause> Thermistor is abnormal.
<Suspected parts> Thermistor.
<Measure> Replace control board.

5. Waste-Ink Full Error/Waste-Ink Full Warning

<Cause> When the waste-ink amount reaches 99%, a waste-ink warning is issued.
When it reaches 100%, the waste-ink full error occurs.
<Suspected parts> Waste-ink absorber and control board.
<Measure> 1. Replace printer base unit (replace waste-ink absorber) and reset the EEPROM.
2. Replace the control board and reset the waste-ink amount in the EEPROM.

6. Automatic Correction Error

7. Home Position Error

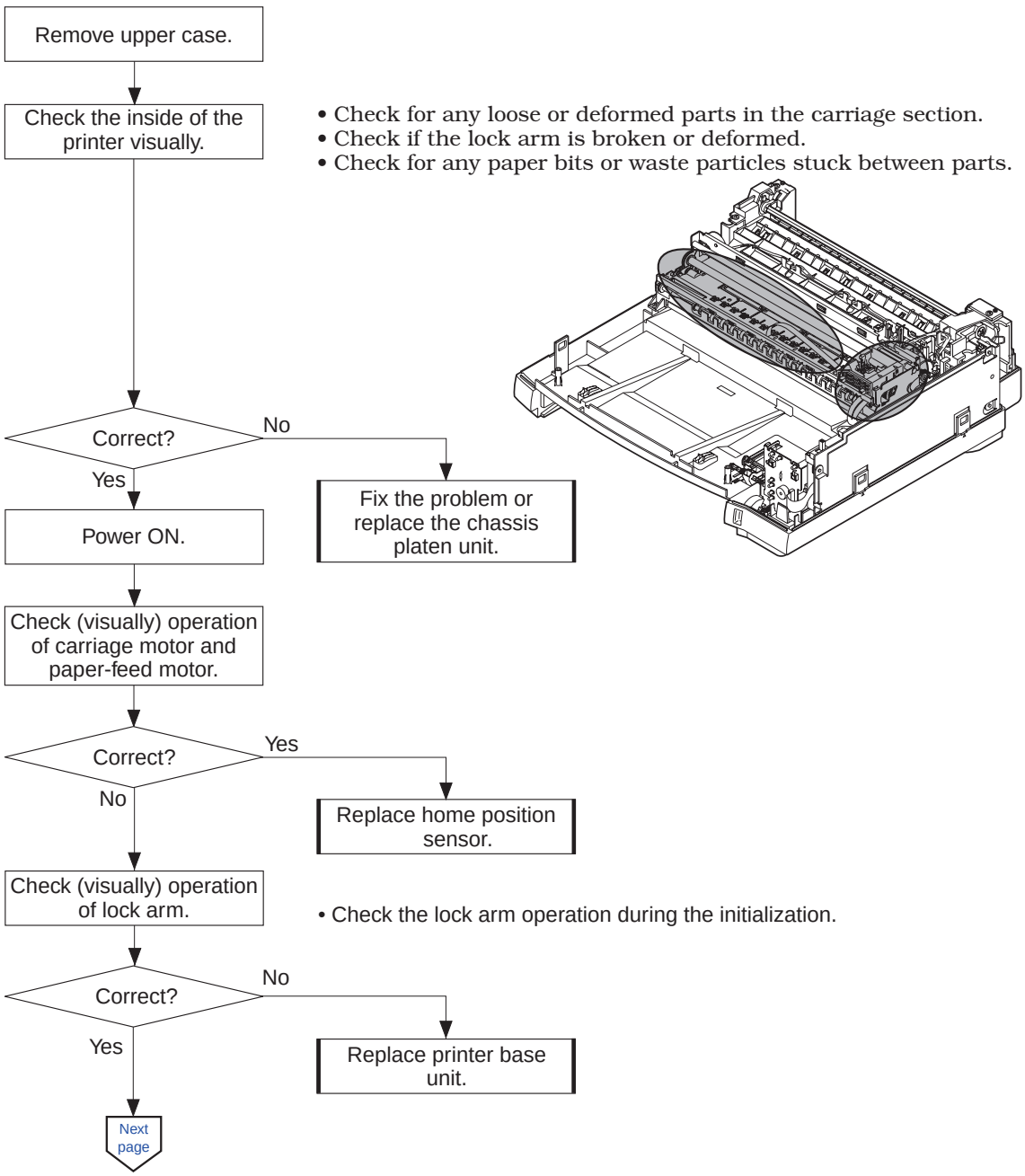
<Cause>

Automatic correction error: The printing correction cannot be detected properly.

Home position error: The home position sensor cannot detect the carriage.

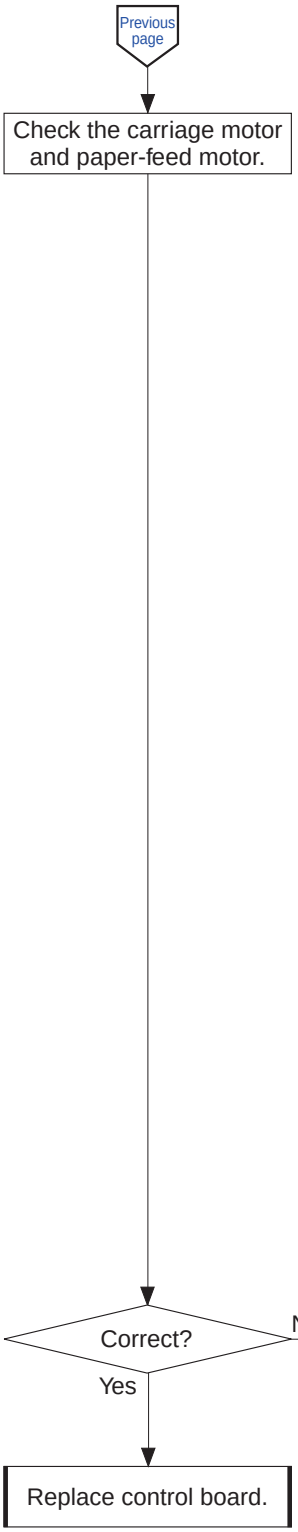
<Suspected parts> Home position sensor, carriage motor, paper-feed motor, control board, carriage ribbon cable, lock arm, and printer base unit

<Measure>

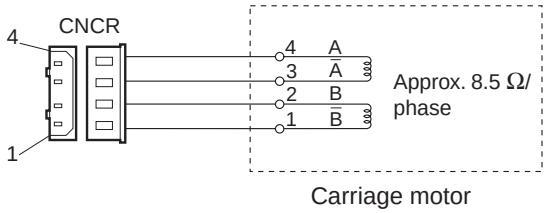


• Check for any loose or deformed parts in the carriage section.
• Check if the lock arm is broken or deformed.
• Check for any paper bits or waste particles stuck between parts.

• Check the lock arm operation during the initialization.



Carriage motor

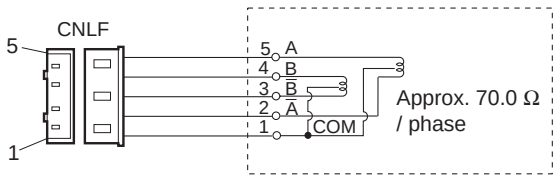


Carriage motor

Measuring Point		Normal Value
CNCR Pin No.	1-2	Approx. 8.5 Ω
	3-4	

- Before measuring, disconnect the carriage motor's connector from the control board.

Paper-feed motor



Paper-feed motor

Measuring Point		Normal Value
CNLF Pin No.	2-5	Approx. 70.0 Ω
	3-4	

- Before measuring, disconnect the paper-feed motor's connector from the control board.

- Faulty carriage motor.
- Faulty paper-feed motor.

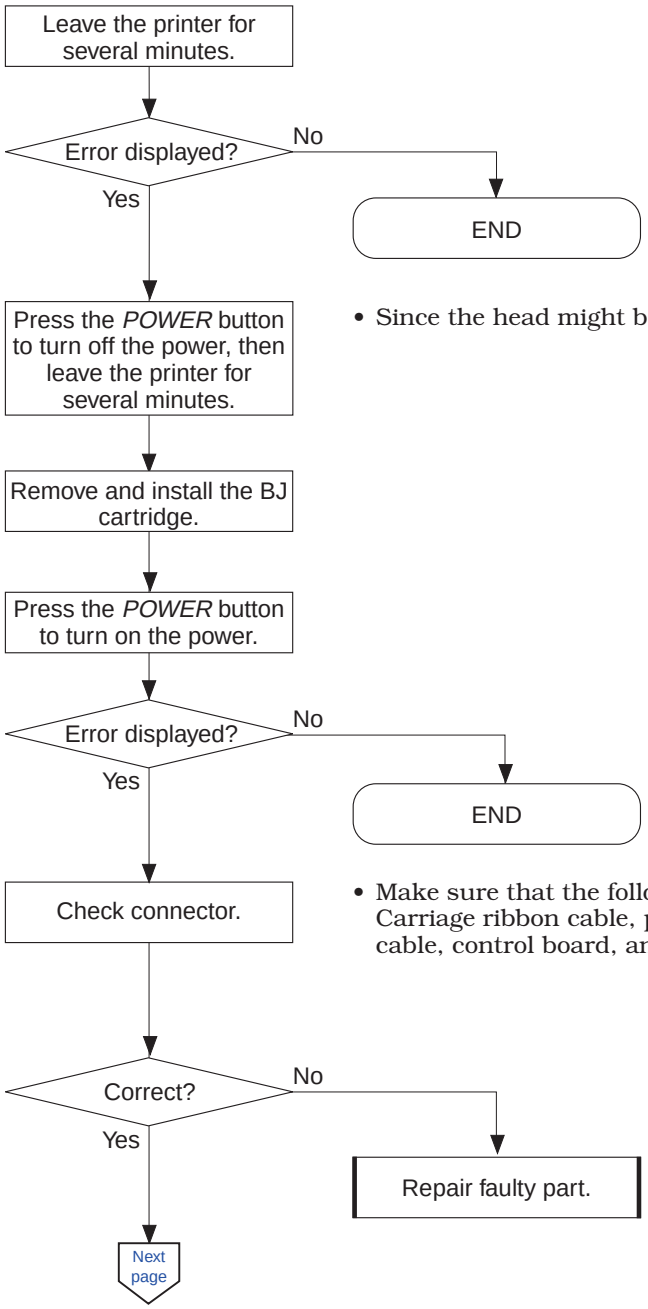
8. Head Overheating Error

<Cause> The head temperature is abnormally high.
Even after the head's power is turned off, the head temperature does not go down.

<Suspected parts> There is no ink in the BJ cartridge and ink cartridge.
Control board

9. Cartridge Overheating Warning

<Measure>

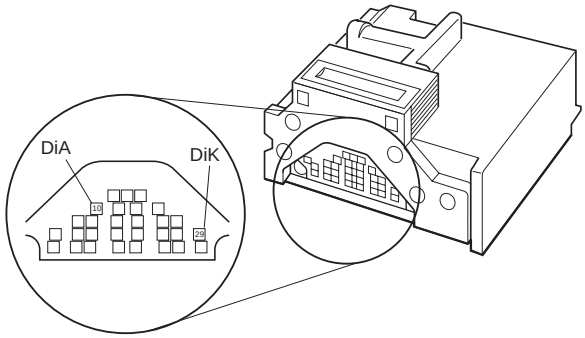


- Since the head might be hot, do not touch the carriage.

- Make sure that the following connectors are connected securely: Carriage ribbon cable, paper-feed motor cable, carriage motor cable, control board, and panel cable.

Previous page

Check BJ cartridge temperature sensor resistance.



Measuring Point			Normal
	+	–	
Pin No.	10	29	Conducting
	29	10	Not conducting

The measuring point and normal value are the same for the black BJ cartridge, color BJ cartridge, and photo BJ cartridge.

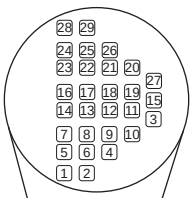
Correct?

No

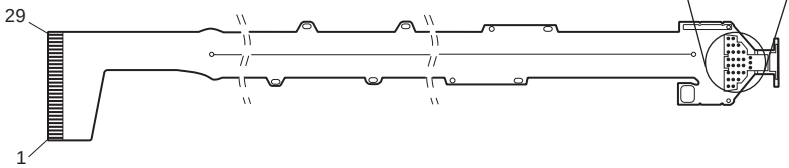
Yes

Replace BJ cartridge.

Check the carriage ribbon cable.



• Check for conduction in pins 10, 29, and 11.



Carriage ribbon cable

Correct?

No

Yes

Replace chassis platen unit.

• Faulty carriage ribbon cable

Replace control board.

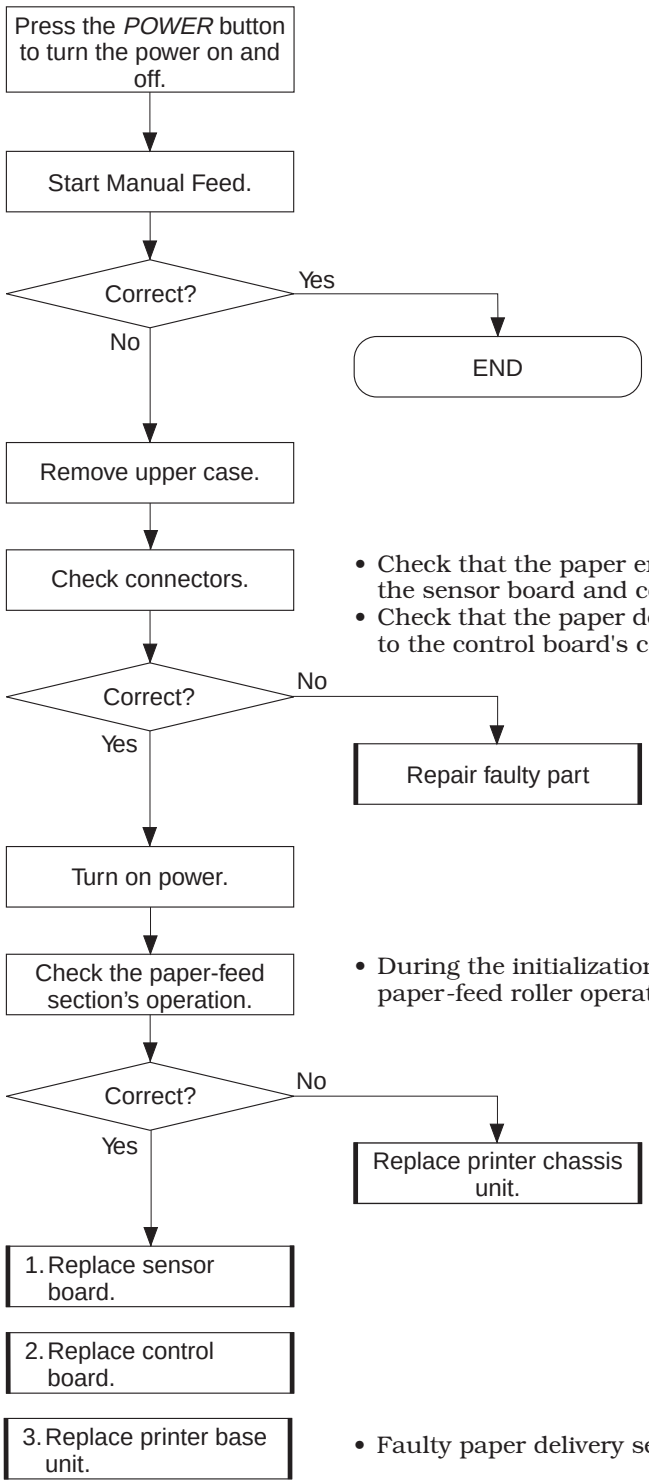
Troubleshooting

10. Failed Manual Feed Warning

<Cause> This indicates that the paper was not picked up properly during manual feeding.

<Suspected parts> Printer chassis unit, control board, paper-end sensor, paper delivery sensor

<Measure>

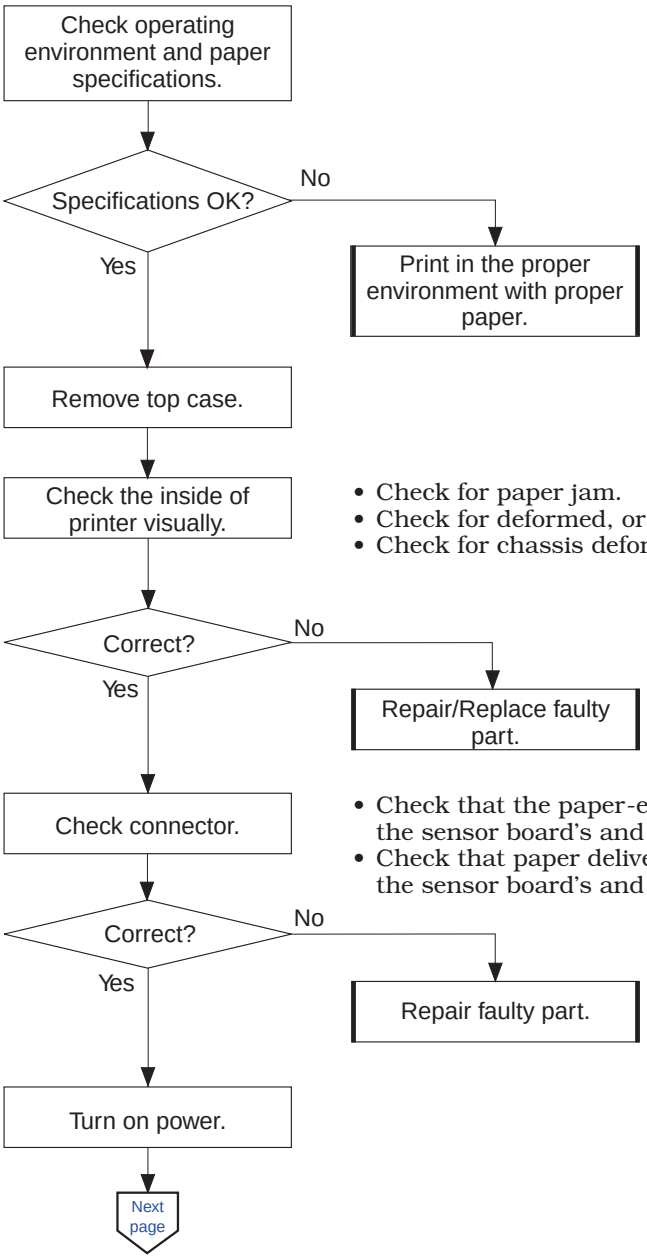


11. Paper-feed Error/Paper Jam Error

<Cause> Paper cannot be picked up.
Paper cannot be delivered.

<Suspected parts> Pick-up unit, chassis platen unit, printer base unit, sensor board, control board, paper-end sensor

<Measure>



Previous page

Check operation of paper-feed section and paper delivery section.

- Check if the paper-feed motor and eject roller operates during the initialization.
- Check for any abnormal noise.
- Check if the paper-feed motor is out of step.

Correct?

No

Repair/Replace faulty part.

- Chassis platen unit or etc.

Yes

Check pick-up operation.

- Start the paper pick-up from the cassette and check the operation of the pick-up section.
- Check if the pick-up roller and ASF roller rotate.
- Check for any abnormal noise.
- Check if the paper-feed motor is out of step.

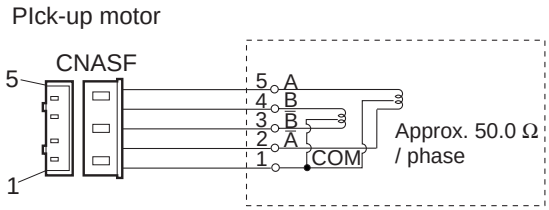
Correct?

No

Yes

Check the pick-up motor.

PIck-up motor



Measuring Point		Normal Value
CNASF Pin No.	2-5	Approx. 50.0 Ω
	3-4	

- Before mesuring, disconnect the pick-up motor's connector from the control board.

Correct?

No

Yes

Replace cassette.

Replace pick-up unit.

Check the paper delivery sensor.

- Use a sheet of paper to check if it moves smoothly.
- Check if it is deformed or broken.

Correct?

No

Yes

Replace printer base unit.

1. Replace sensor board.
2. Replace control board.

12. Cartridge not-loaded Error

<Cause>
- The cartridge cannot be detected.
- No cartridge has been installed.

13. No-cartridge Error

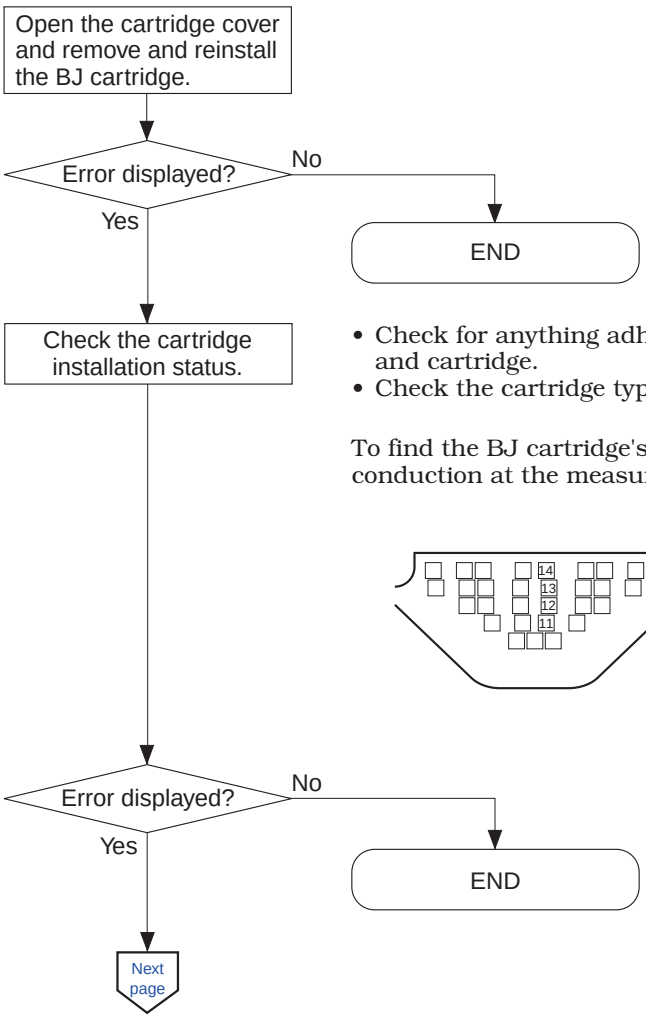
<Cause>
- The cartridge cannot be detected at the position other than the cartridge replacement position.

14. Cartridge Mismatch Error

<Cause>
- The proper cartridge is not installed.

<Suspected parts> Cartridge, control board, carriage ribbon cable, faulty contact between the carriage and cartridge.

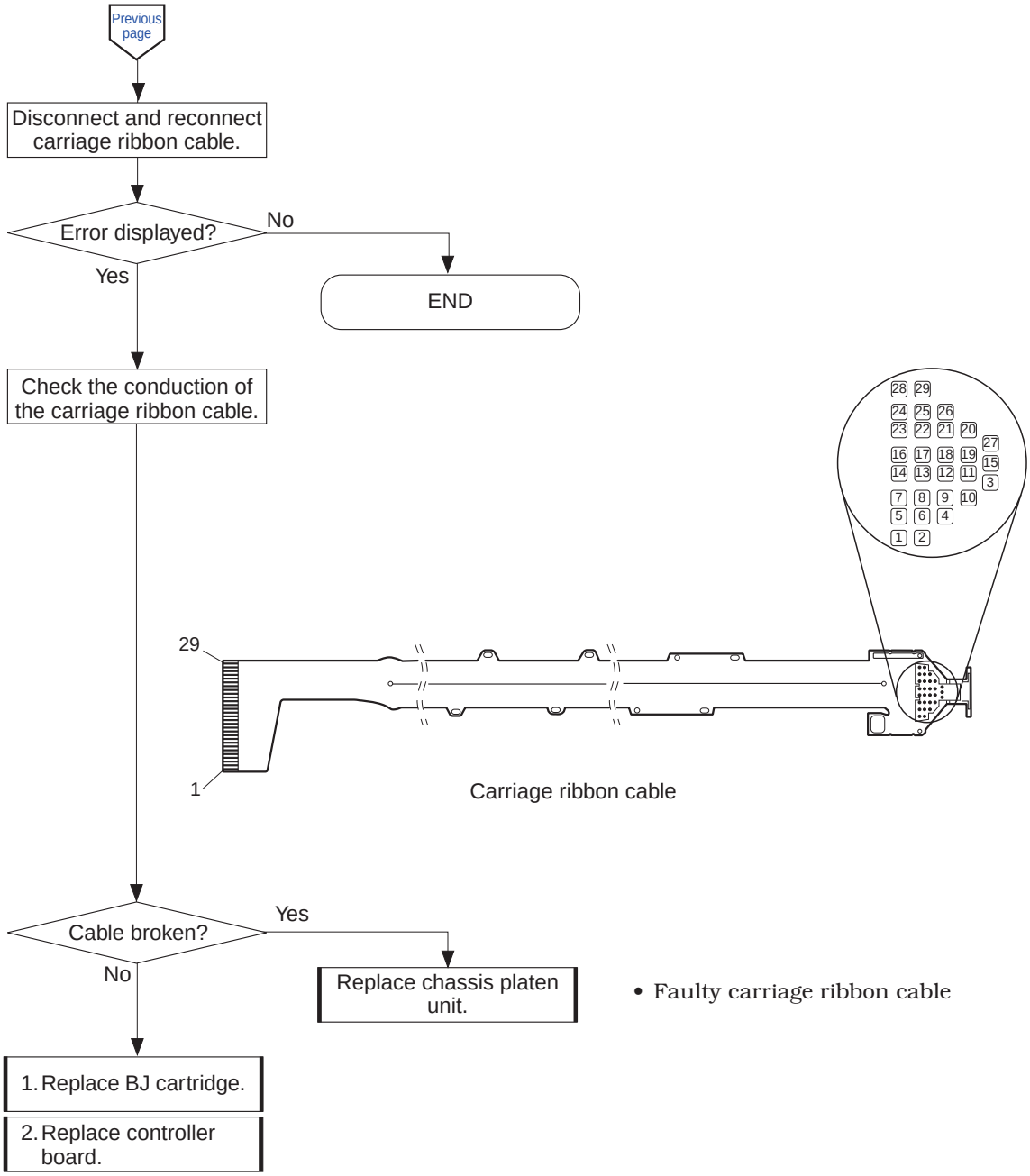
<Measure>



- Check for anything adhering to the contact between the carriage and cartridge.
- Check the cartridge type (see below).

To find the BJ cartridge's identification problem, check the conduction at the measuring points shown below.

	Resistance (Ω) Between Pins		
	11-14	12-14	13-14
BC-10	0	0	∞
BC-11e	∞	0	0
BC-12e	∞	∞	0



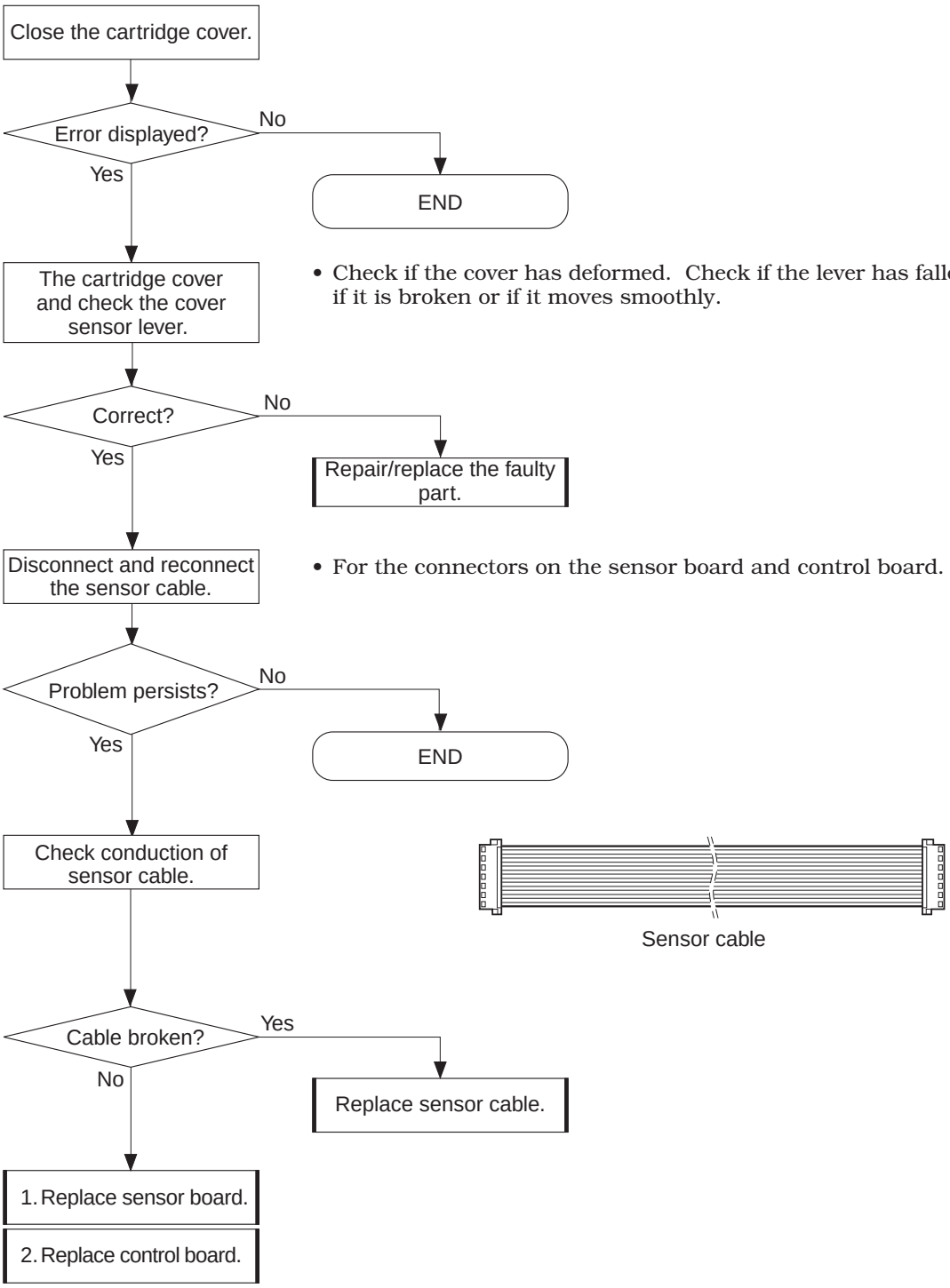
- Faulty carriage ribbon cable

15. Cartridge Replacement Auto-completion Warning

<Cause> The carriage was detected to be at the cartridge replacement position for 10 min. or longer. (Mistaken operation by the user or faulty cartridge cover sensor.)

<Suspected parts> Cartridge cover sensor, sensor lever, sensor board, sensor cable, control board

<Measure>



2. TROUBLESHOOTING BY SYMPTOMS

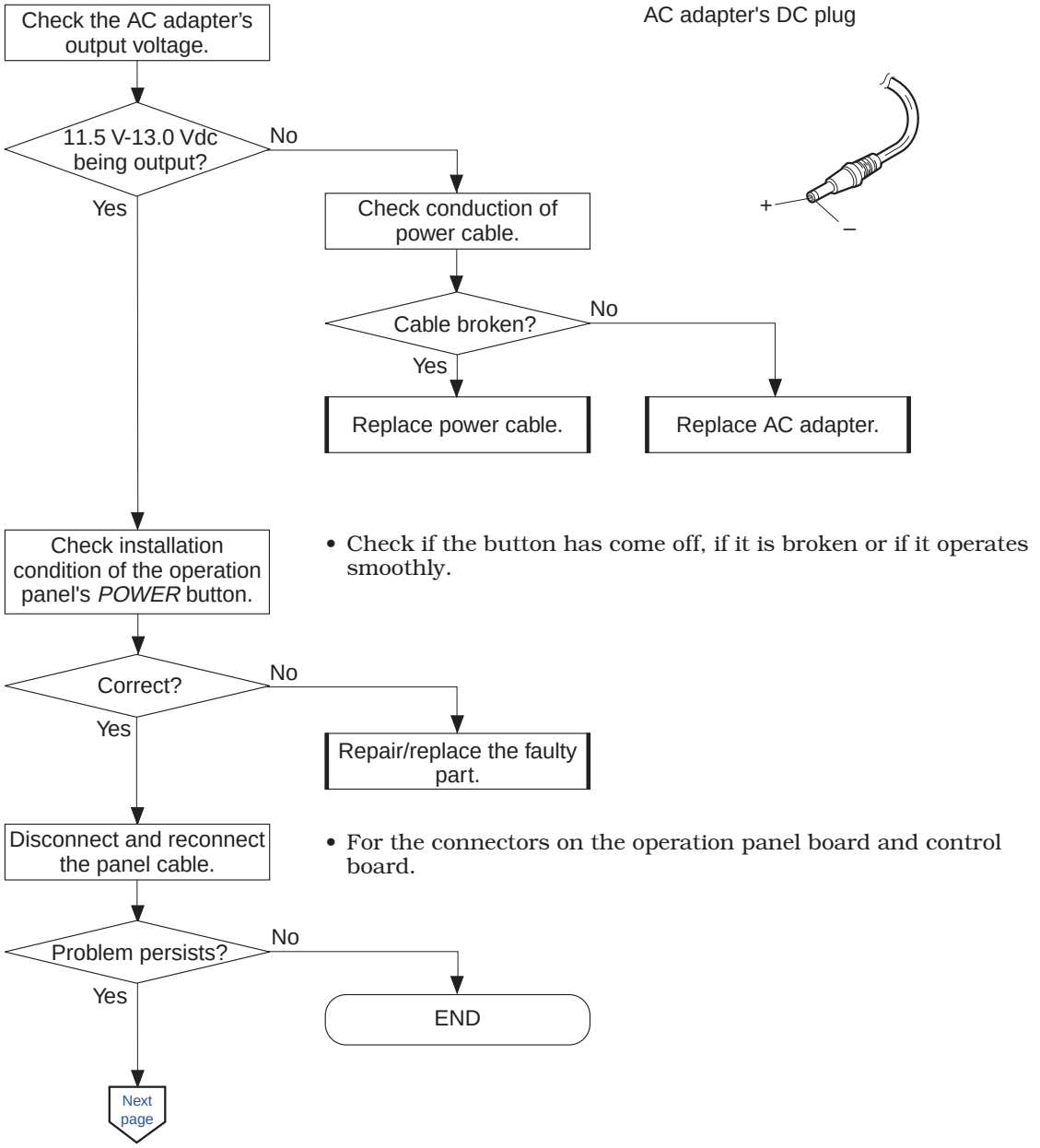
2.1 Troubleshooting By Symptoms

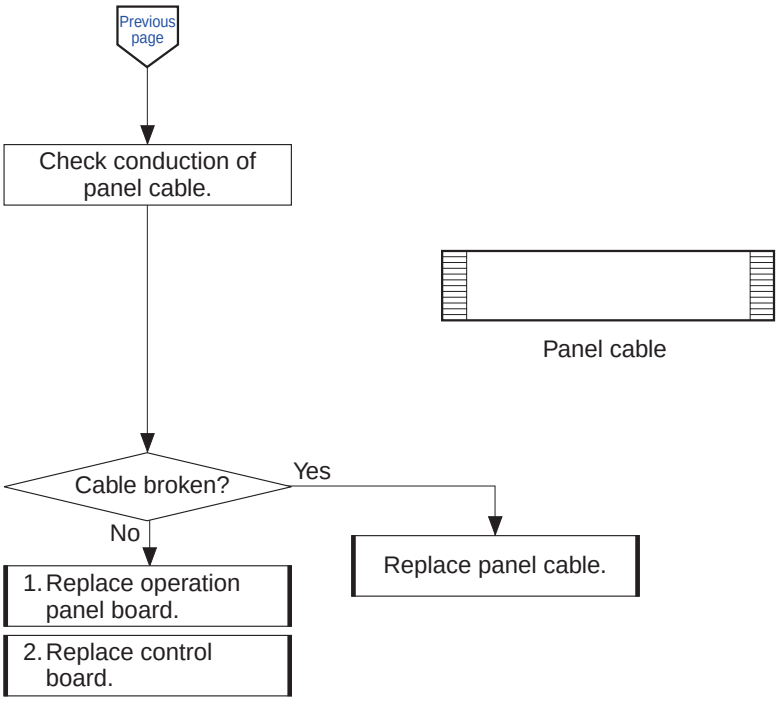
1. The Power Does Not Turn On

<Problem> • The power does not turn on even when the *POWER* button is pressed.
• Initialization is not executed even when the *POWER* button is pressed.

<Cause> Faulty AC adapter, Faulty power cable, Faulty *POWER* button, Faulty operation panel board, Faulty panel cable, Faulty control board

<Measure>



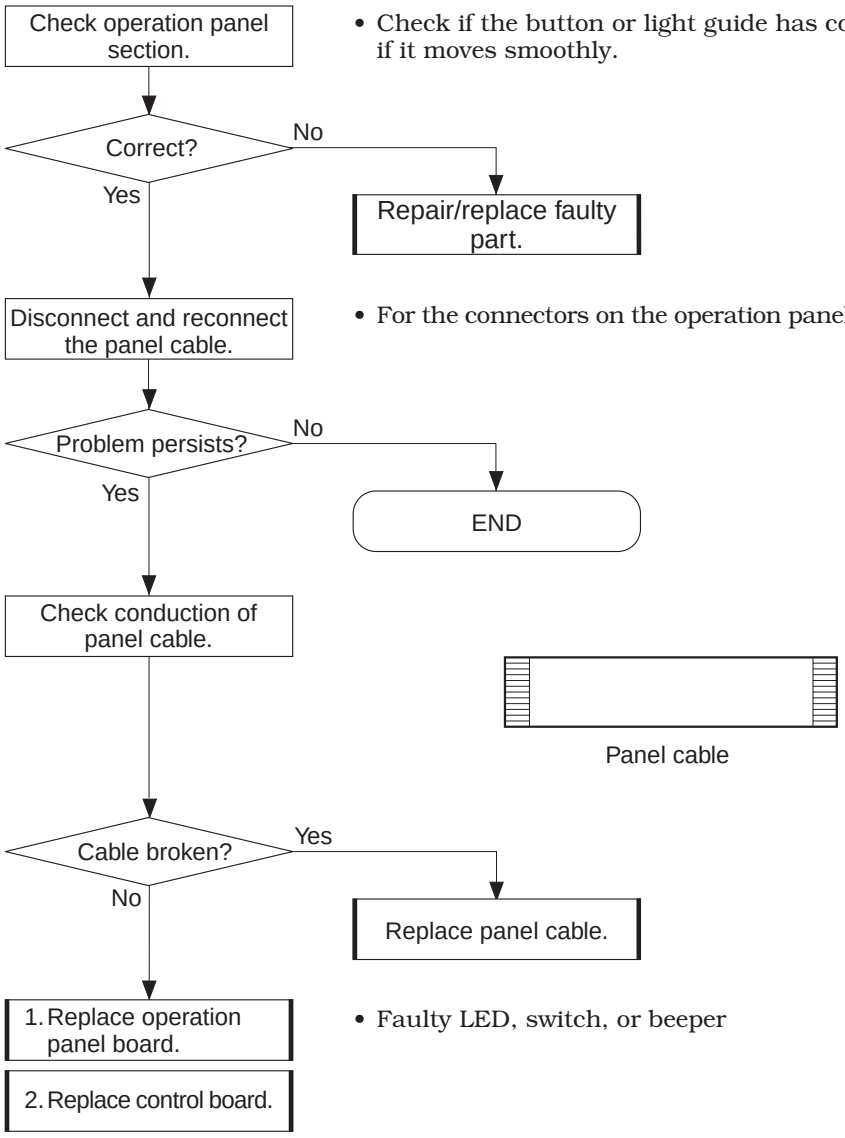

Previous page
Check conduction of panel cable.
Panel cable
Cable broken?
Yes
No
Replace panel cable.
1. Replace operation panel board.
2. Replace control board.

2. Faulty Operation Panel

<Problem> • Indicators (*POWER*, *BUSY*, *ERROR*) do not light.
• Beeper does not sound.
• The *POWER* button and *RESUME* button do not work.

<Cause> Faulty LED, switch, or beeper. Faulty panel cable or control board.

<Measure>



• Check if the button or light guide has come off, if it is broken, or if it moves smoothly.

• For the connectors on the operation panel board and control board.

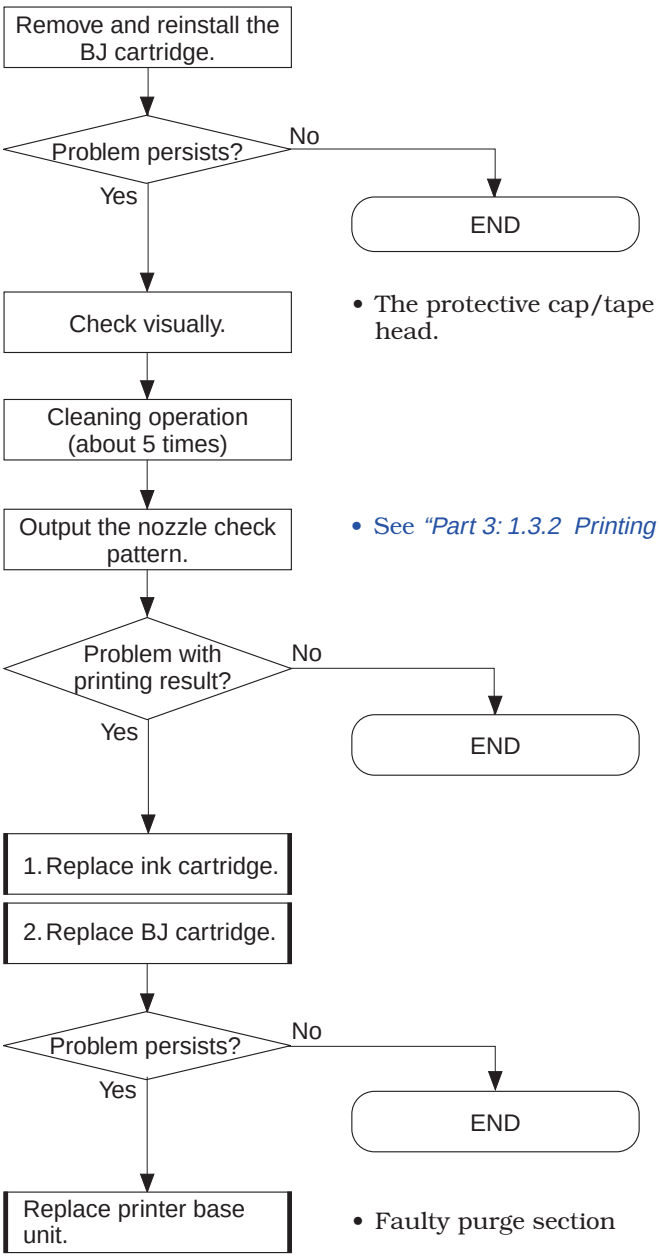
• Faulty LED, switch, or beeper

3. Faulty Printing /No Printing

<Problem> • Nothing is printed.
• No printing midway.
• Only a certain color is not printed.

<Cause> Faulty ink cartridge, faulty BJ cartridge, faulty purge section
The protective cap/tape is still on the head.

<Measure>



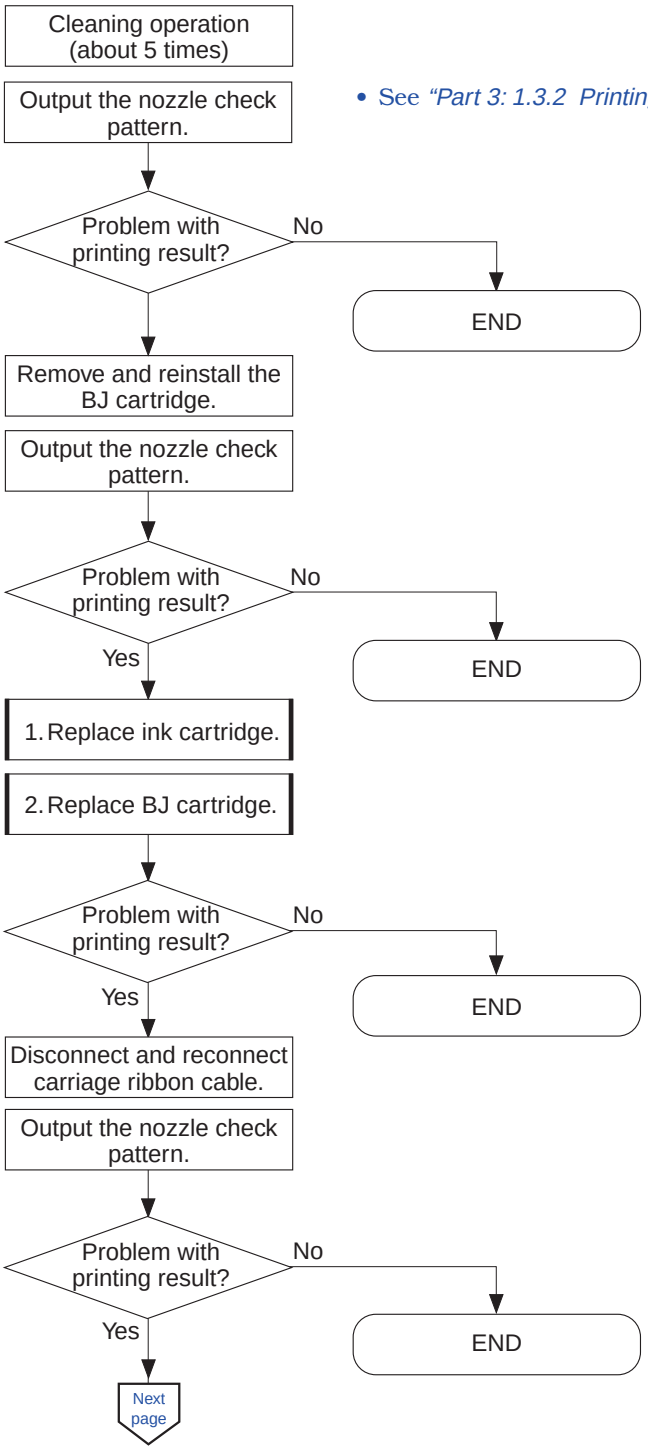
- The protective cap/tape should not be on the BJ cartridge's head.
- See *"Part 3: 1.3.2 Printing the nozzle check pattern" (page 3-8.)*
- Faulty purge section

4. Faulty Printing White Stripes Appear

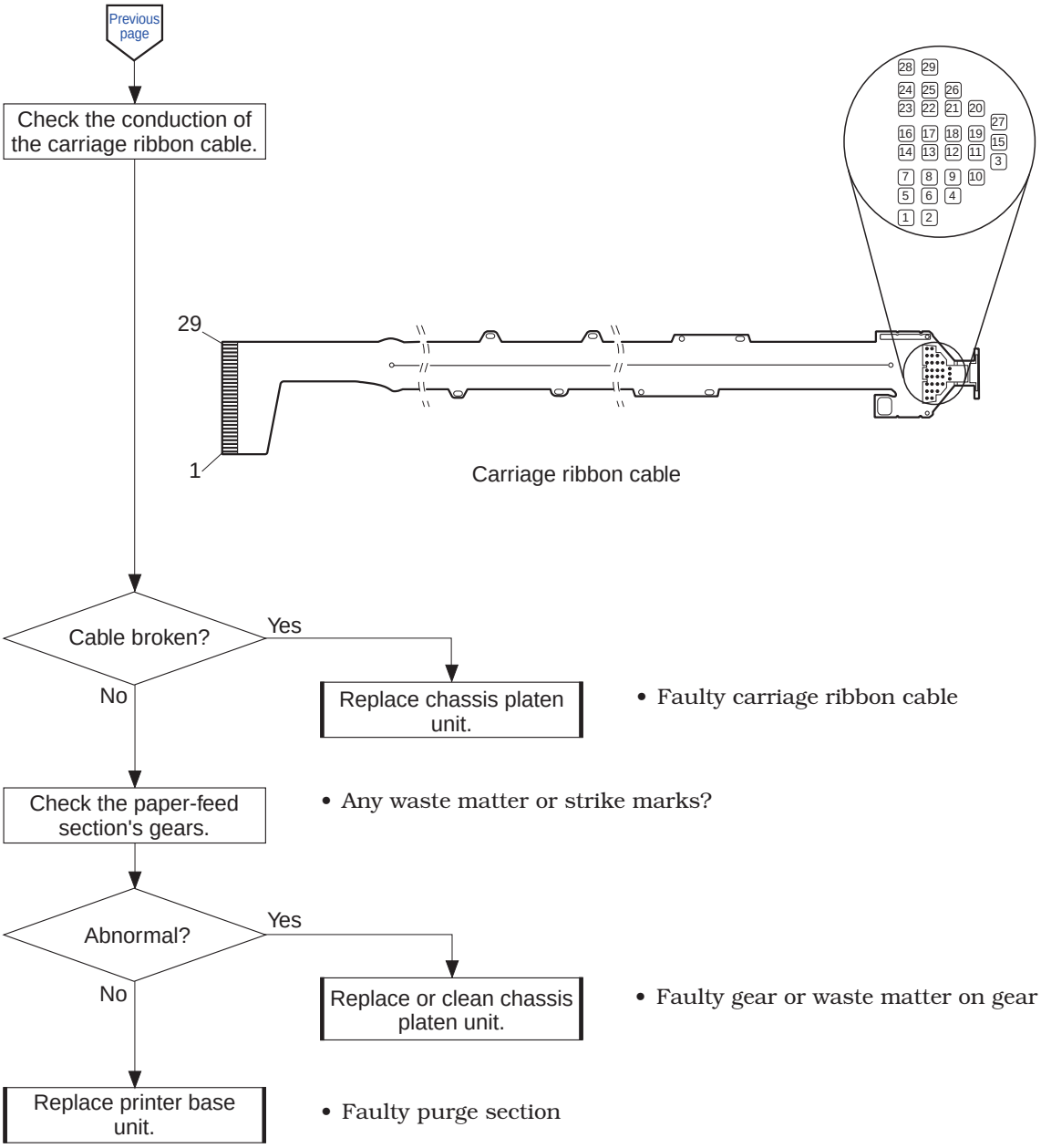
<Problem> • There is smearing.
• There are white stripes.
• Certain dots are not printed.

<Cause> Faulty ink cartridge, faulty BJ cartridge, faulty BJ cartridge contact, cartridge ribbon cable, purge section, control board

<Measure>



• See *"Part 3: 1.3.2 Printing the nozzle check pattern" (page 3-8.)*


Previous page
Check the conduction of the carriage ribbon cable.
29
1
Carriage ribbon cable
Cable broken?
Yes
No
Replace chassis platen unit.
• Faulty carriage ribbon cable
Check the paper-feed section's gears.
• Any waste matter or strike marks?
Abnormal?
Yes
No
Replace or clean chassis platen unit.
• Faulty gear or waste matter on gear
Replace printer base unit.
• Faulty purge section

5. Faulty Printing Other Printing Problems

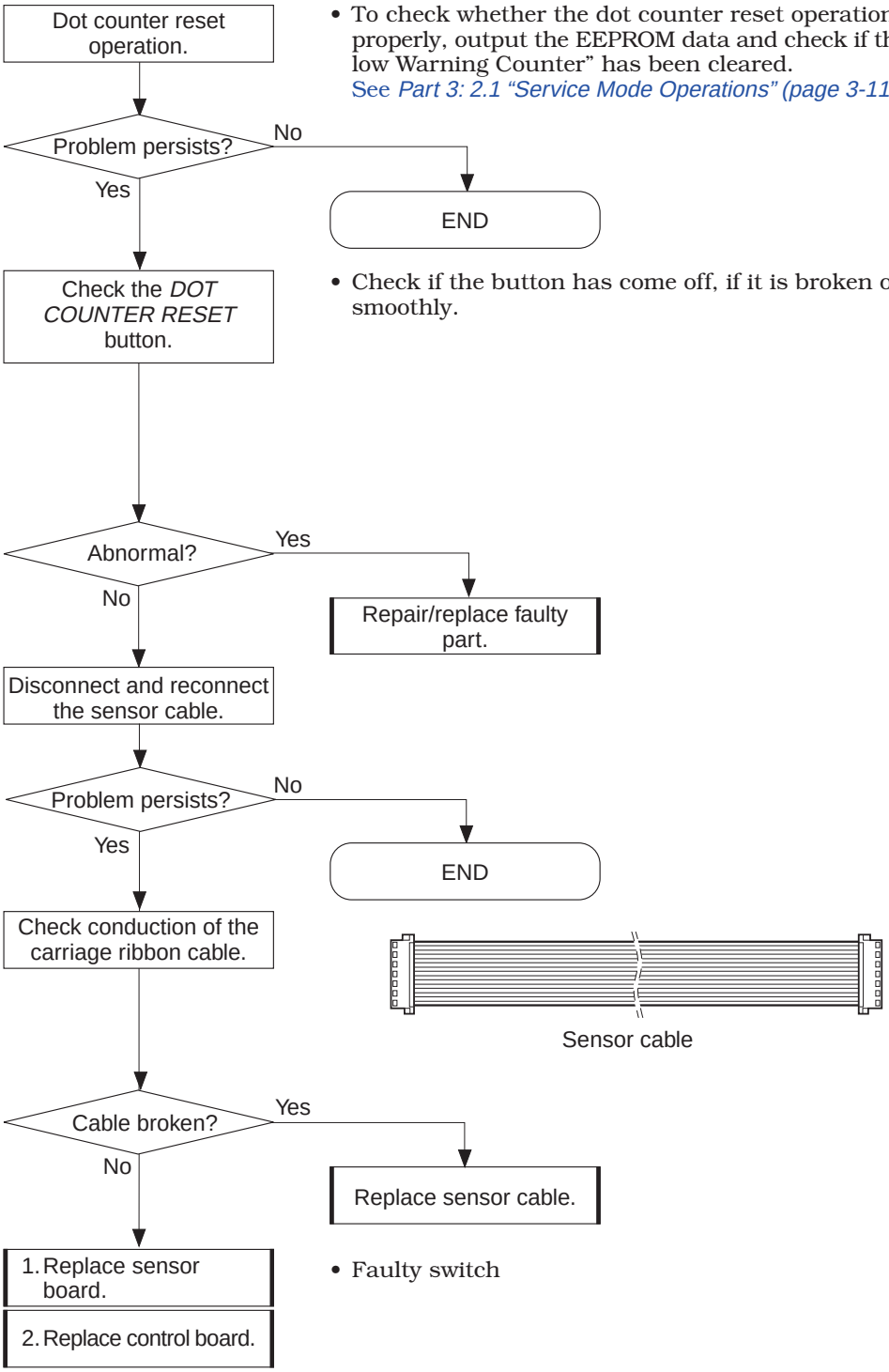
Problem	Check Item	Solution
• Soiled paper	Caused by a dirty platen.	Use a soft, damp cloth to clean the platen.
	There is a build-up of ink around the head's nozzles (The paper is not soiled if the paper is only fed and discharged without printing.)	Execute cleaning a few times. If that does not work, replace the BJ cartridge.
	Check for any dried ink, paper bits, or foreign matter adhering to the purge section's wiper and around the cap.	Replace the printer base unit.
	Check for any ink adhering to the paper transport parts. (The paper is already soiled when it reaches the platen.)	Clean the paper-feed roller, ASF rollers, and pick-up roller rubber.
• Spur tracks	Ink is adhering to the spur.	Use the spur cleaner (special tool) to clean the spur.
	Deformed spur tips.	Replace the printer base unit.
• Broken vertical lines	The BJ cartridge is not properly installed.	Reinstall the BJ cartridge.
	The problem also occurs when the user's BJ cartridge (defective) is installed in a non-defective printer.	Replace the BJ cartridge.
	Check the printing mode.	Set the printing mode again.
• Wavy printing	Deformed chassis.	Replace the chassis platen unit.
	Friction between the carriage unit and carriage shaft.	Replace the chassis platen unit.
• Uneven printing density	Check the printing mode.	Set the printing mode again.
	Faulty BJ cartridge.	Replace BJ cartridge.

6. The Ink-Low Indicator Lights Even with Enough Ink

<Problem> • Although there is enough ink, the ink-low indicator turns on.

<Cause> Dot counter reset operation error, faulty dot counter reset button, faulty control board, faulty sensor board, faulty sensor cable.

<Measure>



• To check whether the dot counter reset operation was executed properly, output the EEPROM data and check if the value for "Ink-low Warning Counter" has been cleared.
See *Part 3: 2.1 "Service Mode Operations" (page 3-11.)*

• Check if the button has come off, if it is broken or if it moves smoothly.

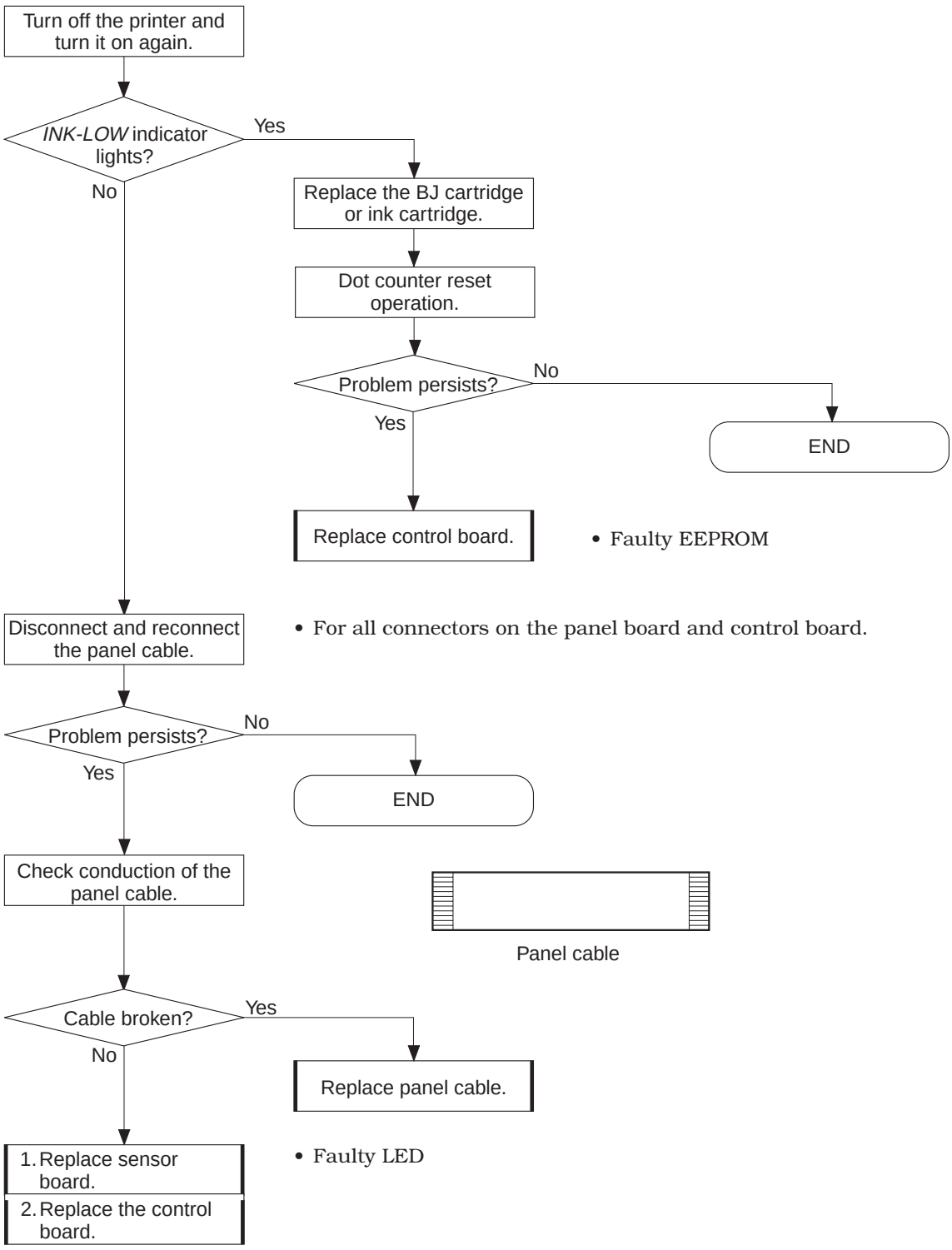
• Faulty switch

7. The Ink-Low Indicator Does not Light Even When Ink is Low

<Problem> • Although there is no ink, the *INK-LOW* indicator does not light.

<Cause> Dot counter reset operation error, faulty dot counter reset button, faulty control board, faulty sensor board, faulty sensor cable.

<Measure>

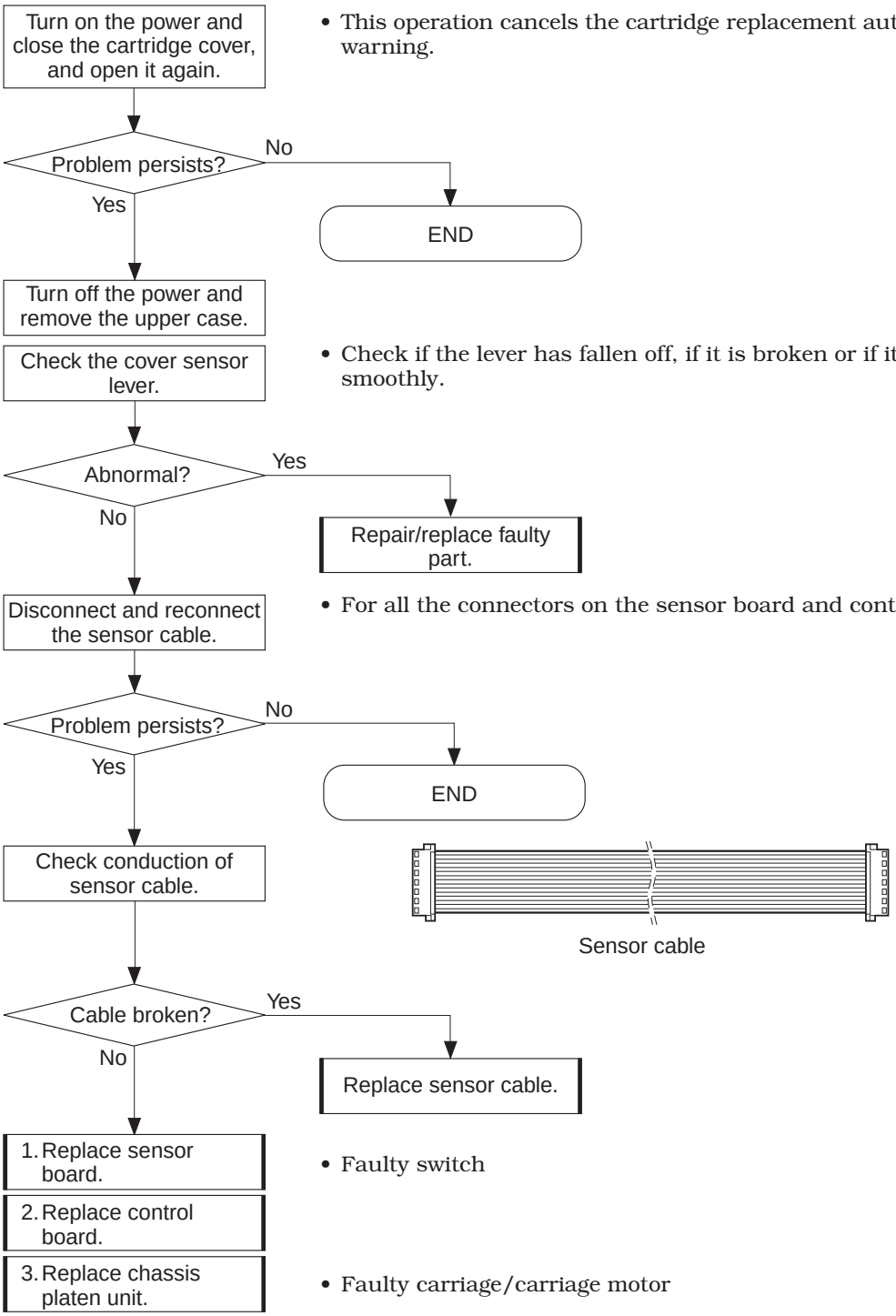


8. The Carriage Does not Move to the Replacement Position Even When the Cartridge Cover is Opened

<Problem> • The carriage does not move to the replacement position even when the cartridge cover is opened.

<Cause> The cartridge replacement termination warning is issued, faulty cartridge cover sensor, faulty sensor board, faulty control board, faulty sensor cable, faulty carriage, faulty carriage motor.

<Measure>



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Part 5

APPENDIX

1. TECHNICAL REFERENCE

1.1 Description of Paper-feed Section

1.1.1 Construction of paper-feed section

The printer's paper-feed section consist of the pick-up section, transport section, and paper delivery section. The function and construction of these components are described below.

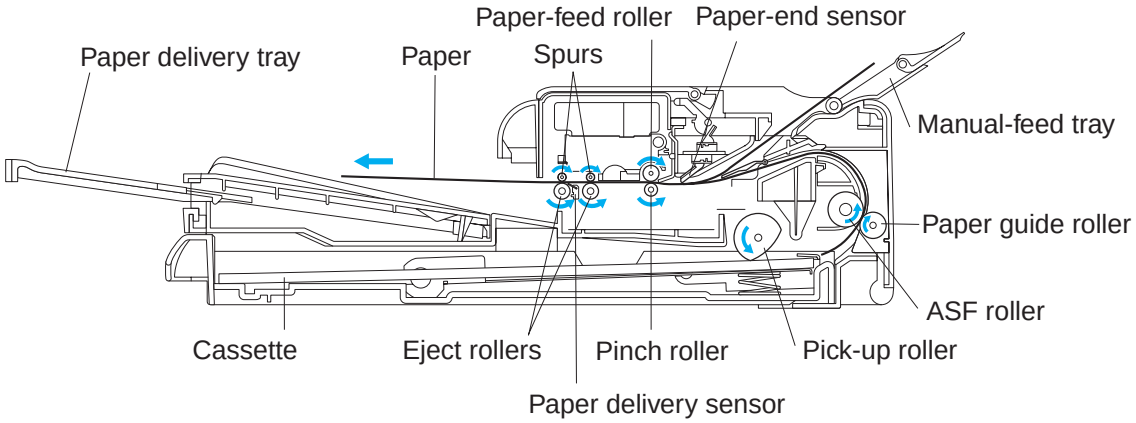


Figure 5-1 Paper-Feed Path

1.1.2 Pick-up section

The pick-up roller picks up the paper from the cassette and the ASF rollers deliver it to the transport section.
(During manual feed, the pick-up section is not used since the paper is inserted directly to the transport section through the manual-feed slot.)
The pick-up unit has a pick-up roller, driven by the pick-up motor, and ASF rollers. When the printer receives a printing command or pick-up command, the pick-up roller rotates once to deliver the paper to the ASF rollers and paper guide rollers. When the ASF rollers grab the paper, the pick-up roller rotates to its initial position so it does not obstruct the paper transported by the ASF rollers. *(Fig. 5-2a)*
The ASF rollers transport the paper up to the transport section's paper feed roller. When the paper feed rollers grabs the paper edge, the ASF rollers move to its standby position. The paper is thereby freed from the ASF rollers, and the transport section does not obstruct the paper transport. *(Fig. 5-2b)*

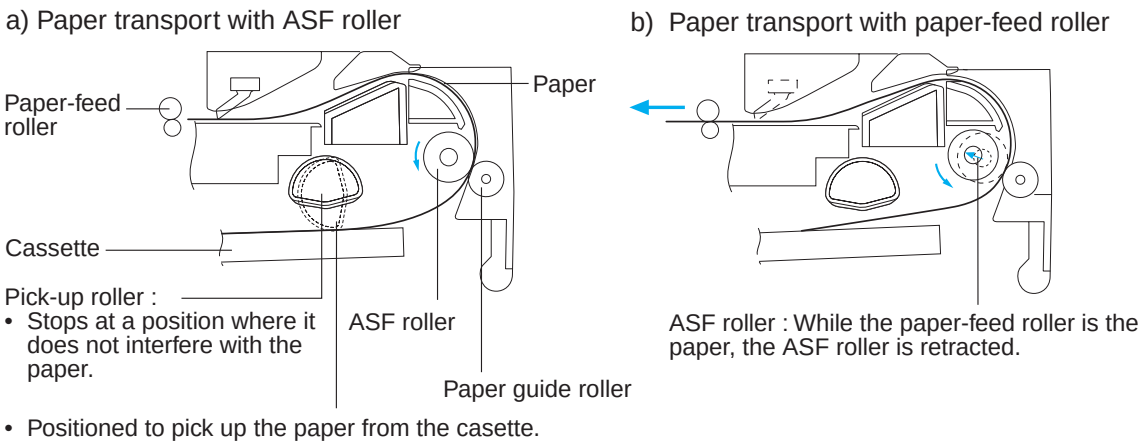


Figure 5-2 Pick-up Section

1.1.3 Transport section

The transport section consists of the paper feed roller driven by the paper-feed motor and the pinch roller. After these two rollers take the paper through the printing position, they deliver the paper to the paper delivery section.

(1) Cassette feeding

When the paper delivered from the pick-up section turns on the paper-end sensor, the paper-feed motor starts up and drives the paper feed roller.
After the paper feed roller first rotates in reverse to fix the skewed sheet (see *"1.1.7 The form alignment function"*), it rotates forward until the paper reaches the printing start position.
If the paper-end sensor does not turn on even though the pick-up section executed the pick-up operation, a paper-feed error will result.

(2) Manual feeding

When the paper inserted in the manual-feed slot turns on the paper-end sensor, the paper-feed roller rotates to feed the paper. When the front edge of the paper is detected by the paper delivery sensor, the paper-feed roller rotates in the reverse direction and sends the paper back to the starting position for printing. The operation then stops.
When the paper does not turns the paper delivery sensor on under the rotating the paper-feed roller, the paper feed motor rotates to send the paper to the manual-feed tray for discharge. Then, the failed manual feed warning is indicated.

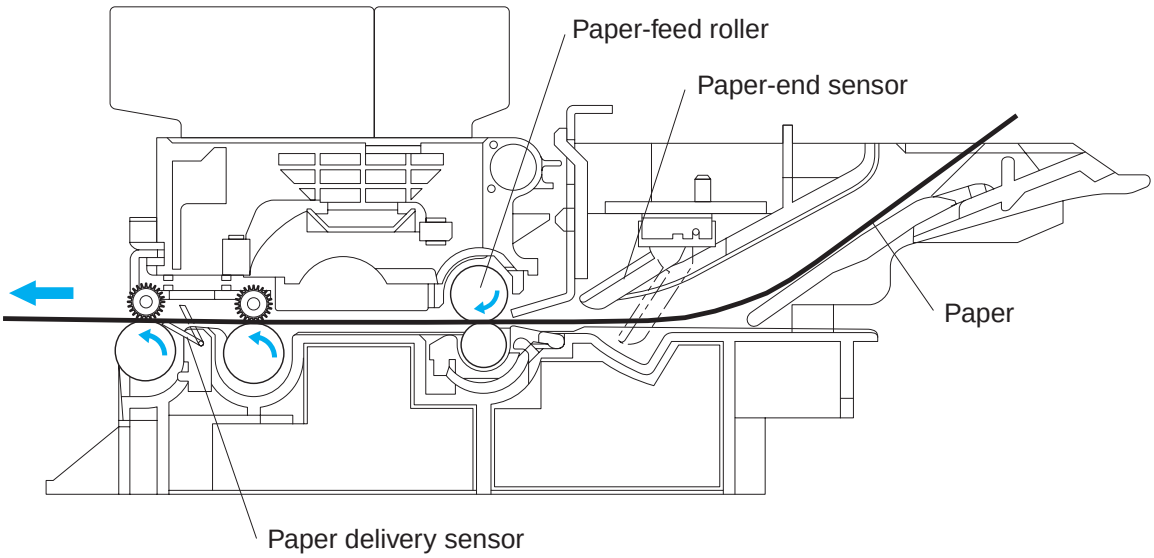


Figure 5-3 Paper Path for Manual Feeding

1.1.4 Paper delivery section

The paper delivery section discharges the paper with the eject roller (driven by the paper feed roller's rotation) and spur.

To avoid soiling the printed side of the paper, the spur presses the paper against the eject roller while the paper is discharged.
If the paper delivery sensor detects that the paper was not discharged after printing, a paper jam error is indicated.

1.1.5 Remaining paper indication function

The printer can indicate the amount of paper remaining in the cassette. When the paper-loaded cassette is installed in the printer, the stack of paper pushes up a lever which indicates the remaining amount of paper.
The drum has white and black sections. The amount in the white section can be checked through the window at the front of the printer.

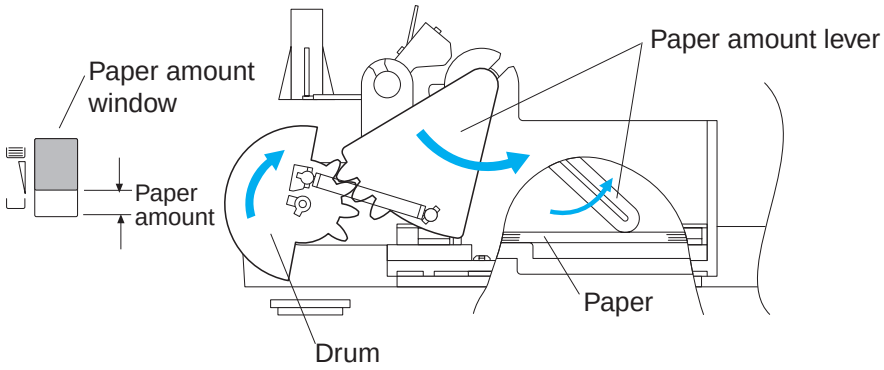


Figure 5-4 Indicating the Remaining Amount of Paper

1.1.6 Pick-up retry function

The pick-up retry operation is executed if the paper-end sensor cannot detect the paper after the pick-up operation. The pick-up is tried again. If the pick-up retry is executed once and the paper pick-up still does not work properly, a paper-feed error occurs.

1.1.7 The form alignment function

Even if the paper is skew when it is picked up, the paper is aligned by the transport section. The paper feed roller rotates in reverse and the paper is set against the pressure roller so that the paper edge becomes parallel to the paper feed roller.

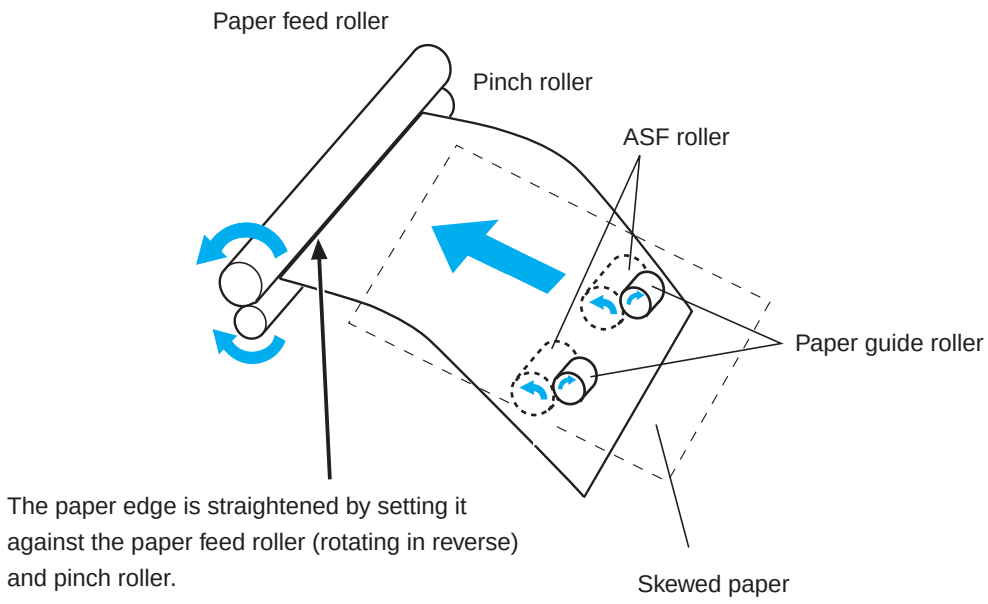


Figure 5-5 Fixing Skewed Paper

1.2 Purge Section

To maintain printing quality, the purge section maintains the BJ cartridge's nozzles.

1.2.1 Cleaning function

Cleaning is performed to prevent defective printing caused by improper ejection of ink by the BJ cartridge head. The cleaning operation combines purging, wiping, and maintenance jet. It executes the following operations:

- Suction: The ink is sucked out of the head to refresh the ink in the head with new ink.
- Maintenance jet: To eliminate any air bubbles in the head's nozzles and to remove waste particles near the nozzle openings, ink is ejected from the nozzles onto the cap and maintenance jet receptacle.
- Wiping: Wipe off paper bits and dried ink on the head's face plate.

Depending on the BJ cartridge type and the printer's condition, the cleaning time and combination of cleaning operations will differ.
Cleaning is performed at the times below to ensure that the head produces high-quality printing.

Table 5-1 INK CONSUMPTION DURING CLEANING

Printer Status		Ink Consumption (approx. mg)	
		BC-10	BC-11e/12e
Power ON with *POWER* button	1) Less than 72 hours elapsed since the last cleaning	7	40
	2) 72 hours or more elapsed since the last cleaning	120	180
	3) 169 hours or more elapsed since the last cleaning	240	260
After BJ cartridge or ink cartridge replacement		240	520
Cleaning executed with the *RESUME* button	1) Cleaning	120	260
	2) Head refreshing	240	520
Upon product arrival		360	520

1.2.2 Description of Purge Section

Cleaning is done by the printer's purge section. When the carriage moves to the right from the home position, the trigger gear attached to the paper-feed gear will start turning. The paper-feed motor's driving force is thereby conveyed to the purge section's gear and cam to drive the cap, wiper, cylinder, and pump.

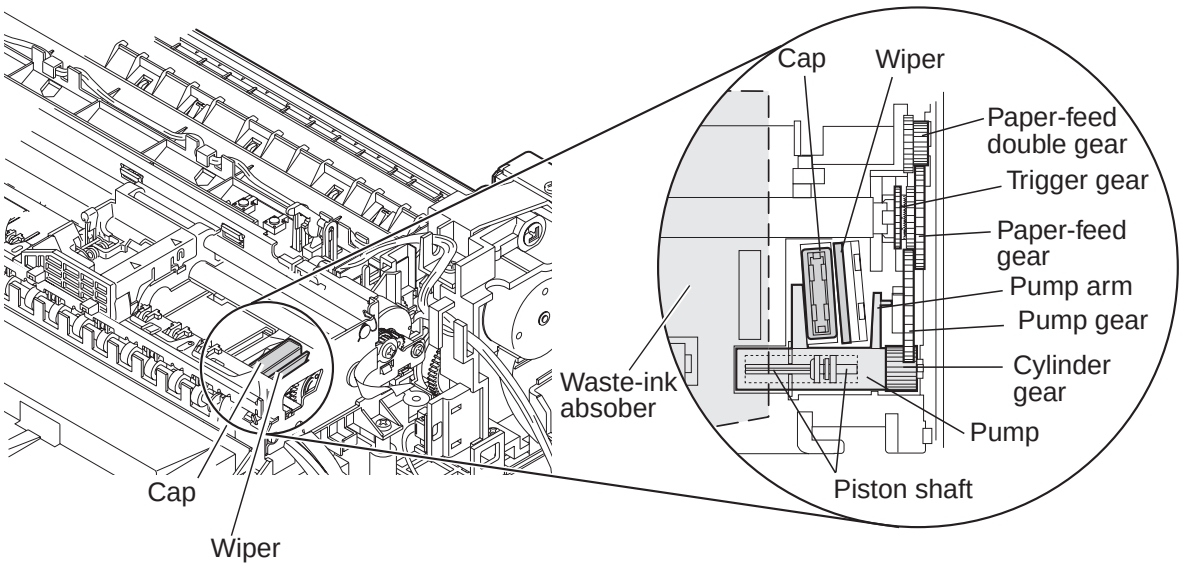


Figure 5-6 Purge Section

a) Capping

Capping resolves or prevents improper ink ejection due to a dried-out face plate on the head. Since the pump arm moves via the pump gear's cam, the cap moves up and down for capping.

When the carriage goes to the home position, the cap is pushed onto the head's face plate to cap it.

Capping is done at the following times:

1. When the power is turned off with the *POWER* button.
2. When the data is not received within the stipulated time during printing.

b) Suction

The purge section's cap is connected to the pump. The piston in the pump is coupled to the cylinder gear which is driven by the pump gear. Ink is drawn from the head to fill the cap when the piston moves to the right to seal the pump. Then the piston is moved to the left to open the pump. The ink in the cap is then drawn into the pump and absorbed by the waste ink absorber via the ink absorber.

c) Wiping

The wiper is set or released by the carriage's wiping hook. When the carriage moves to the right from the home position, the wiper touches the head's aluminum plate and any dirt on the wiper is removed before the wiper proceeds to wipe off ink on the face plate. Also, when the wiper goes down, ink falls off toward the gear. (Wiping)

After the wiping operation, when the carriage moves further to the right, the carriage's hook lever pushes down the latch lever so that the wiper goes down. (Wiper released)

Next, when the carriage moves to the left, the carriage's hook lever pushes down the wiper lever so that the wiper goes to the wiping position again. (Wiper ready position)

Wiping is executed at the following times:

1. During printing, when the printing dot count or printing time exceeds the stipulated value.
2. After purging.
3. Before capping.

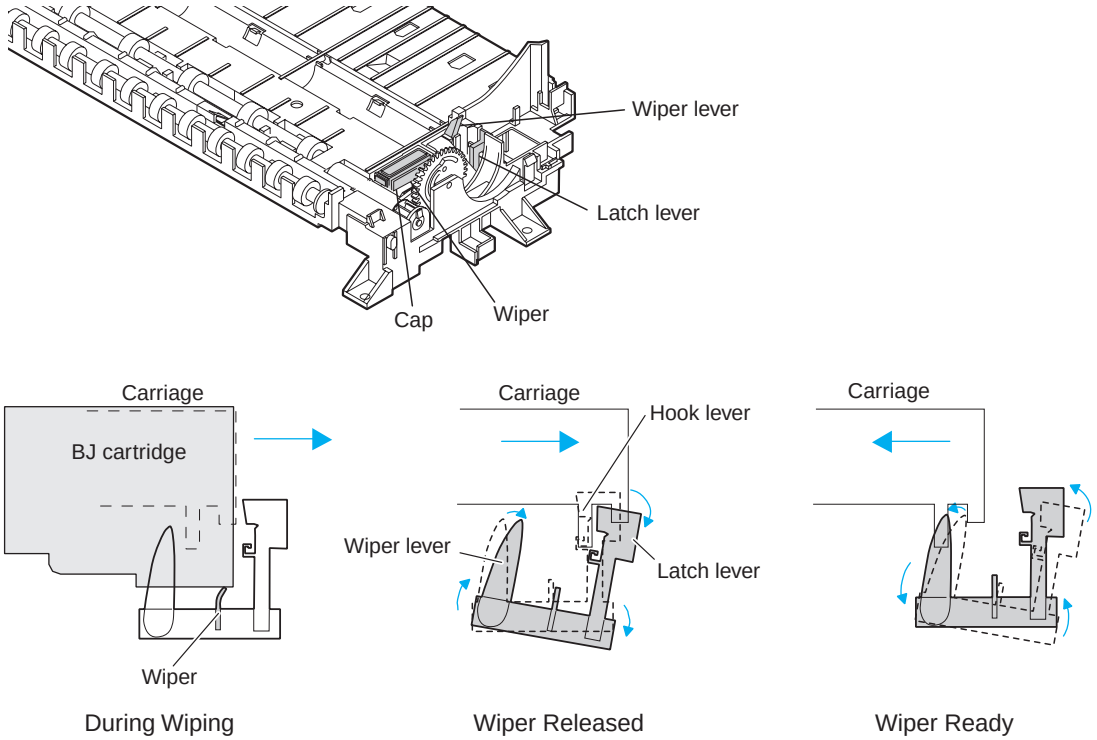


Figure 5-7 Wiping Operation

1.3 Description of Carriage Section

1.3.1 BJ cartridge mounting function

The carriage holds the BJ cartridge and locks it in place mechanically. When a BJ cartridge is installed on the carriage, the carriage ribbon cable's contact is pressed against the BJ cartridge's signal connector to enable printing signals to be transmitted from the control board.

While the printer is turned off, the carriage is locked at the capping position. On the back of the carriage are wiping hooks which release the wiper or sets it to the ready position. It also has a home position edge which blocks the home position sensor on the chassis.

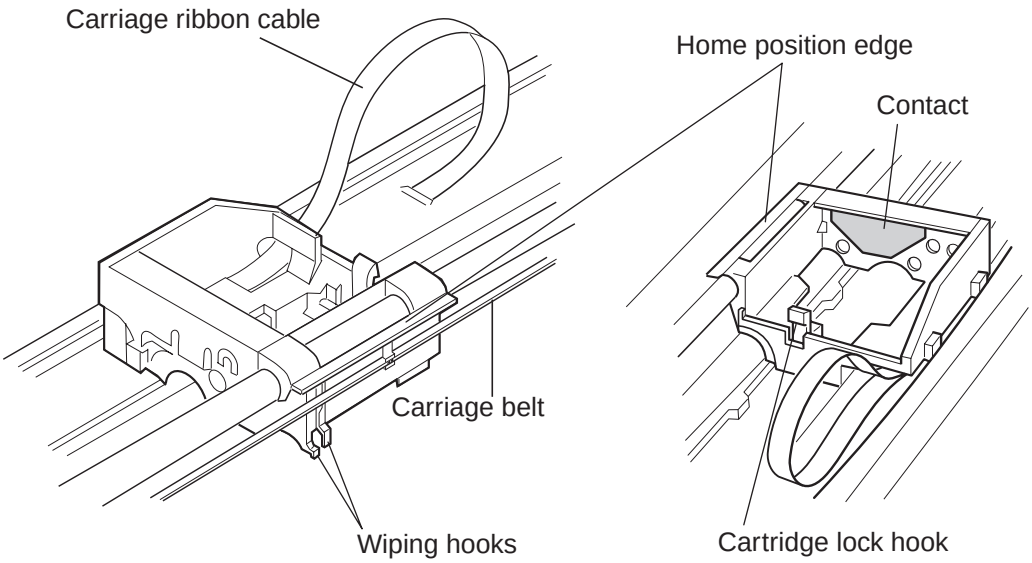


Figure 5-8 Carriage Section Structure

1.3.2 Carriage drive control

The carriage is driven by the carriage motor via the carriage belt. The carriage position is controlled by the MPU sending a stepping pulse to the carriage motor. The carriage position is detected by the home position sensor (on the chassis) detecting the carriage's home position edge.

The mechanical shifting that occurs during bi-directional printing is corrected automatically by detecting the carriage's home position in both directions and shifting the printing starting position with software. A shift correction is made for the initialization after the power is turned on or when the printing starts after the printing mode has been changed.

1.4 Electronic Circuit Description

1.4.1 Printer block diagram

A block diagram of the printer's electronic circuit is shown below.

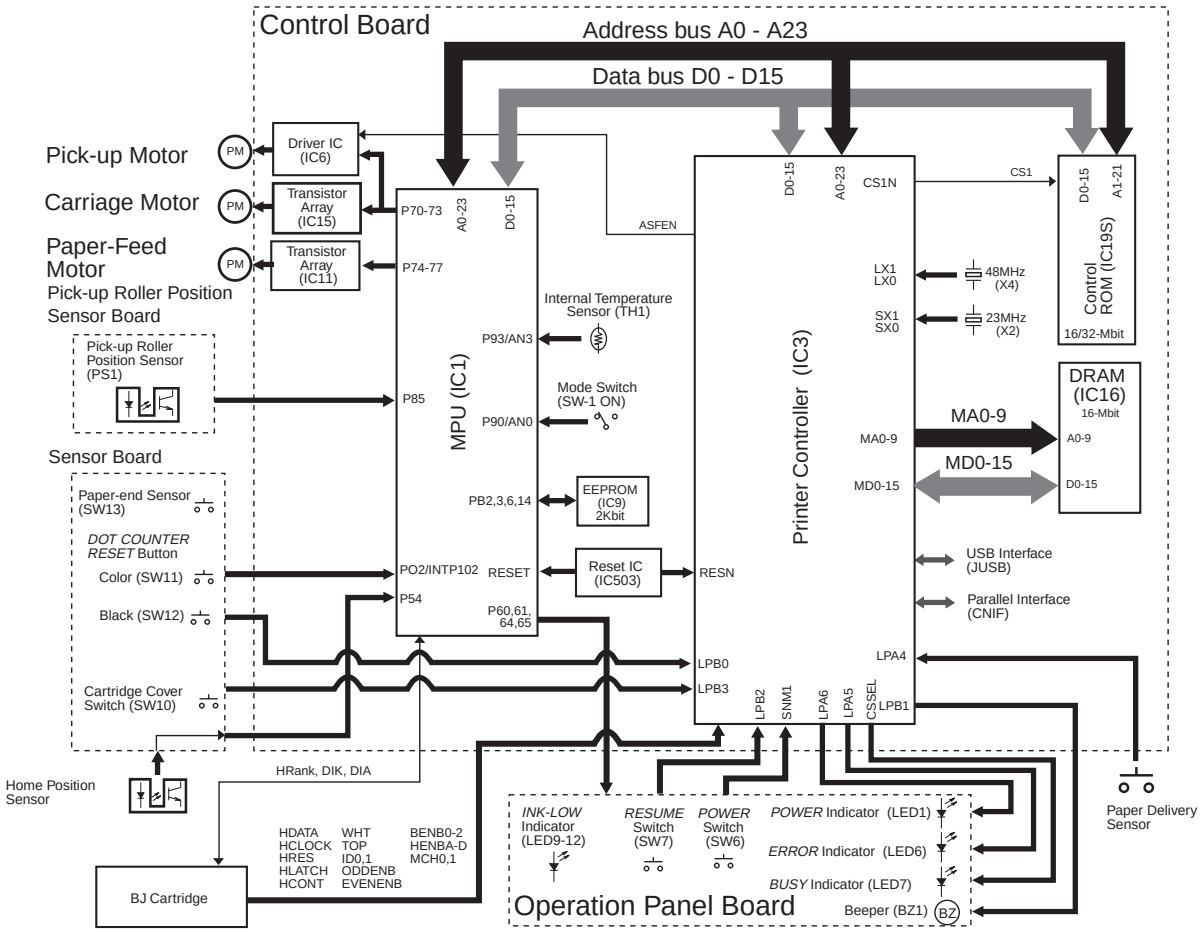


Figure 5-9 Block Diagram

1.4.2 Power source line block diagram

The printer uses an internal power voltage of 5 V/24 V/3.3 V. The power source line's block diagram is shown below.

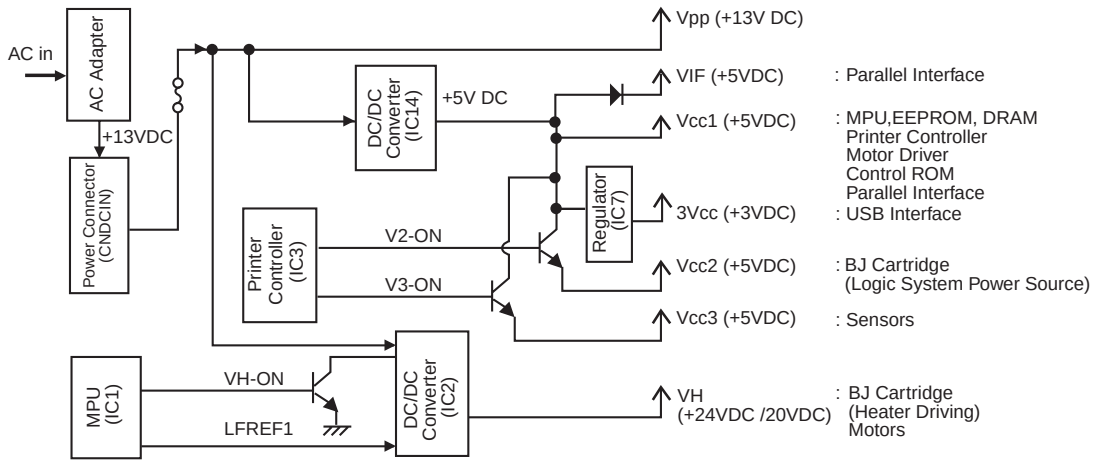


Figure 5-10 Power Source Line Block Diagram

1.4.3 USB interface

With USB, up to 127 peripheral devices can be connected to the computer. It is a serial interface with a high-speed transmission rate of 12 Mbps. It also enables devices to be hot-swappable which means they can be connected or disconnected even while the computer and printer are on. Each device is connected via a port on a hub. The hub tells the computer which ports are connected or unconnected.

Data transmission

With USB, data is transmitted in transfer units called frames which are divided into 1 ms. A series of frames constitute the transmission.
To synchronize with the local clock, all packets start with the SYNC field and end with the EOP (end of packet) field.
The frame string starts with the SOF (start of frame) packet. The SOF consists of the PID (packet identification field) which indicates the packet's type and direction, the frame No., and CRC (cyclic redundancy check) for error checking.
After SOF, the frame contains a token packet and a handshake packet that indicates the status of the data and flow control.
The token packet consists of an address field that can specify PID and 128 addresses, an ENDP (end point) field, and CRC.
The data packet contains PID, data field, CRC, and EOP.
The handshake packet contains only PID.

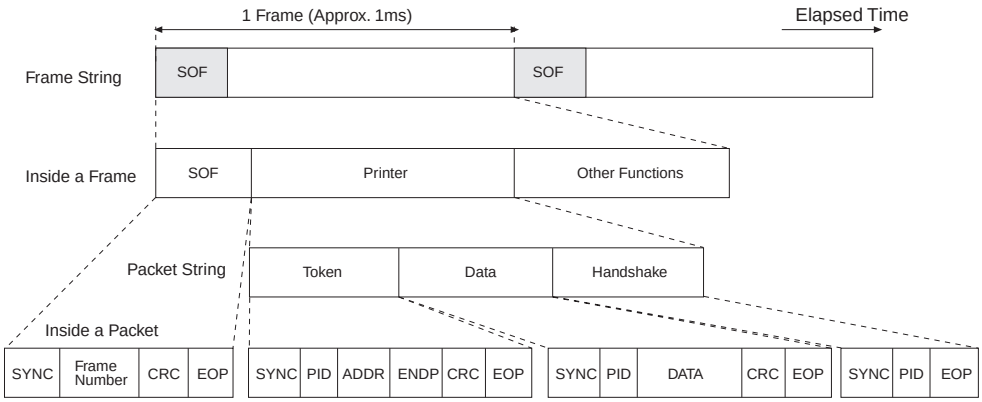


Figure 5-11 USB Data Transfer

Data encoding and decoding

The USB data transfer string is ultimately codified in the NRZI (Non Return to Zero Invert) format. When the original data bit is 0, the transmission data bit is inverted. When the original data bit is 1, the transmission data bit is maintained as is.
If the transfer data's level does not change for a long time, the data's receiving end will be unable to acquire the data's sample position synchronization. This may cause the bit to shift. This is prevented by a method called bit stuffing. The original data before NRZI codification has bit 0 added one time after six consecutive bit 1's.

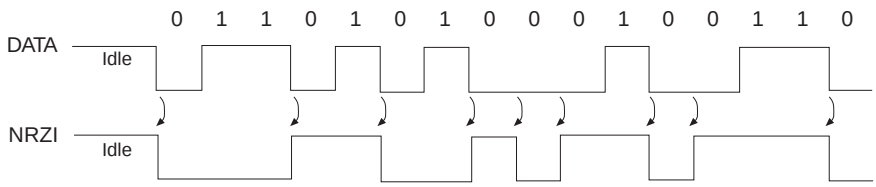


Figure 5-12 NRZI

1.4.4 Automatic interface switching

The printer has an automatic interface switching feature.
When there is no printing from either the USB or parallel interface, printing can be started from either interface.
After printing starts and ends with one interface, the interface cannot be switched until the receiving buffer becomes empty.

1.4.5 Detection functions

The printer has the following detection functions.

Table 5-2 DETECTION FUNCTIONS

Detection Function	Method	Main Purpose
Paper detection (Pick-up/Paper transport section)	Paper-end sensor	Paper detection Paper-feed error detection (during feeding by cassette) Failed manual feed warning detection Paper jam error detection
Paper detection (Paper delivery section)	Paper delivery sensor	Paper detection Printing start position control (during manual feed) Paper jam error detection
Carriage position	Home position sensor	Carriage home position detection
BJ cartridge presence	Carriage cable connector pins 11/12/13 combination	Cartridge not-loaded Cartridge mismatch error Cartridge type identification (See page 5-17)
Ink-low detection	Ink dot counter	*INK-IOW* indicator (See page 3-4)
Waste ink amount	Waste ink counter	Waste ink full warning/error detection
Internal temperature detection	Internal temperature sensor (TH1)	Ink ejection amount control/Abnormal temperature increase detection
Head temperature detection	Diode sensor	Ink ejection amount control
Cartridge cover open	Cartridge cover sensor	The cover open is detected, and the carriage moves to the cartridge replacement position
Pick-up roller home position	Pick-up roller position sensor	Initial position of the pick-up roller detection
Mode detection	Mode switch	Dependent on the connected device's driver (When the printer is connected to the computer, this detection cannot be used.)

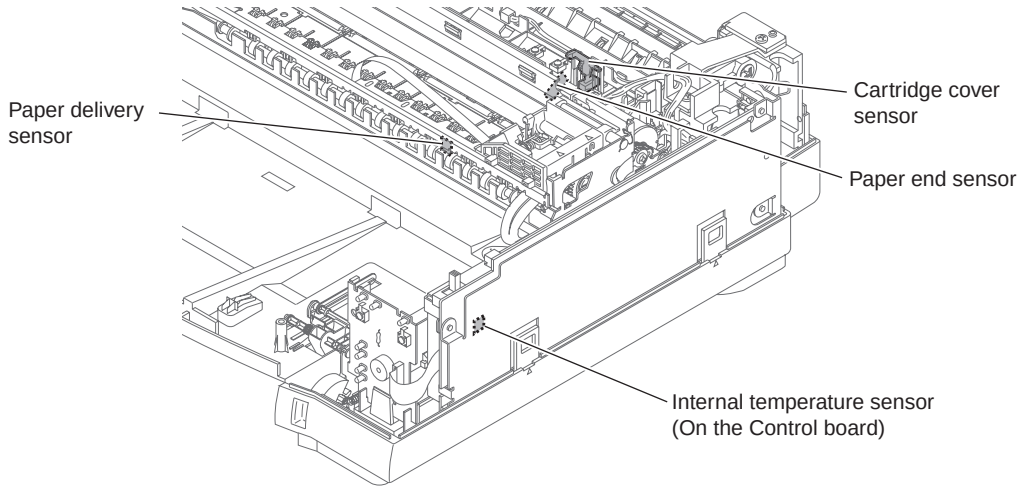


Figure 5-13 Sensor Locations

1.5 BJ Cartridge Description

1.5.1 BJ cartridge and ink cartridge configuration

The printer uses the BJ cartridge and ink cartridge shown below.

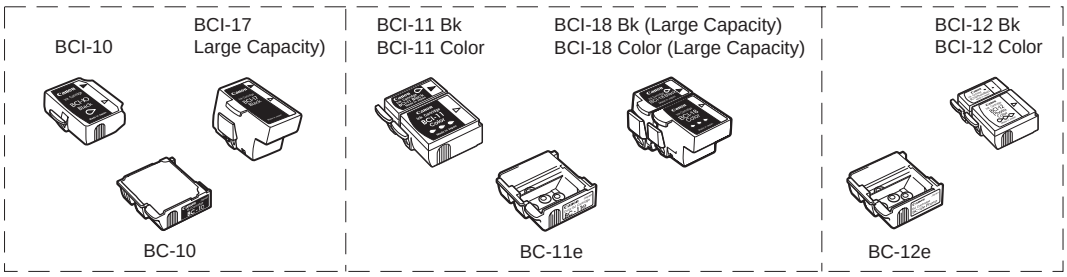


Figure 5-14 Cartridge Configuration

1.5.2 BJ cartridge construction

Each BJ cartridge has a print head having one of the nozzle configurations described below. The ink cartridge is detachable from the BJ cartridge. Also, the ink is a dye-based.

[BJ Cartridge Nozzle Count]

BJ Cartridge	Nozzle Count	
BC-10	128 Nozzles	
BC-11e/BC-12e	Black	64 Nozzles
	Color	24 nozzles/color

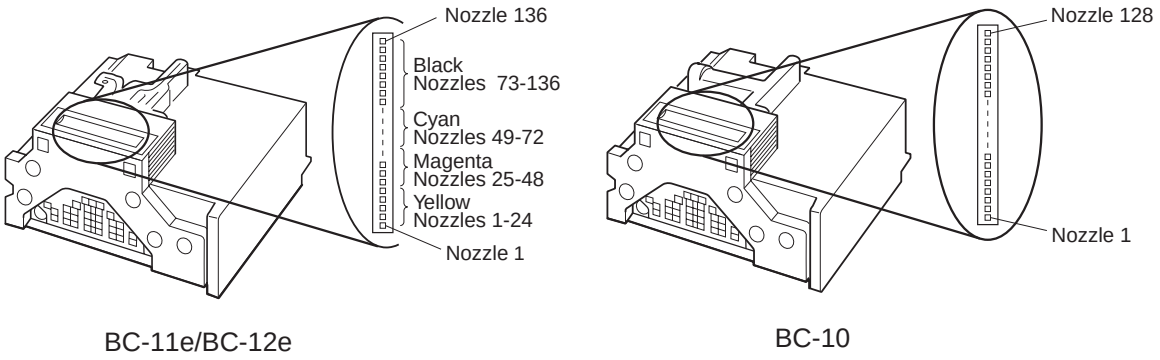


Figure 5-15 Nozzle Array

1.5.3 BJ cartridge printing drive control

The black BJ cartridge executes the same printing drive control as the BJC-85.

1.5.4 BJ cartridge identification

The printer detects the bubble jet head's board signal via the cartridge signal contact. It thereby detects the type of BJ cartridge installed and the head rank.
For details on the signal contact, see *page 5-17 (Table 5-4 HEAD INSTALLATION STATUS AND SIGNAL DETECTION)*.

All BJ cartridges are divided into one of thirteen types in accordance with the production irregularities of the bubble jet head's heater characteristics. While compensating for these irregularities, the printer executes optimum ink ejection control.

1.5.5 Printing mode list

The printing mode list for the black, color, and photo BJ cartridges is shown below.

Table 5-3 PRINTING MODES AND DRIVE METHOD

With Black BJ Cartridge Installed

Printing Mode	Carriage Operation	Nozzles	Resolution [dpi]	Carriage Driving Frequency [kHz]	Head Driving Frequency [kHz]
Bk-HS	1 pass	128 nozzles	180	7.82	7.82
Bk-HQ	1 pass	128 nozzles	360	6.43	6.43
Bk-FINE	4 passes	32 nozzles	360	6.43	6.43
Bk-Smoothing	1 pass	128 nozzles	360	3.91	7.82
Bk-HQ (720)	1 pass	128 nozzles	720	6.43	12.86
Bk-FINE (720)	4 passes	32 nozzles	720	6.43	12.86

With Color BJ Cartridge Installed

Printing Mode	Carriage Operation	Nozzles	Resolution [dpi]	Carriage Driving Frequency [kHz]	Head Driving Frequency [kHz]
Bk & White-HS	1 pass	64 nozzles	180	7.82	7.82
Bk & White-HQ	1 pass	64 nozzles	360	6.43	6.43
Bk & White-FINE	4 passes	16 nozzles	360	6.43	6.43
Color-HS	1 pass	24 nozzles	180	7.82	7.82
Color-HQ	1 pass	24 nozzles	360	6.43	6.43
Color-FINE	3 passes	8 nozzles	360	6.43	6.43
Color-HQ (720)	1 pass	24 nozzles	720	4.73	9.46
Color-FINE (720)	3 passes	8 nozzles	720	6.43	12.83

With Photo BJ Cartridge Installed

Printing Mode	Carriage Operation	Nozzles	Resolution [dpi]	Carriage Driving Frequency [kHz]	Head Driving Frequency [kHz]
Photo-FINE (720)	3 passes	8 nozzles	720	5.00	10.00

2. CONNECTOR LOCATIONS AND PIN ARRAY

2.1 Control Board

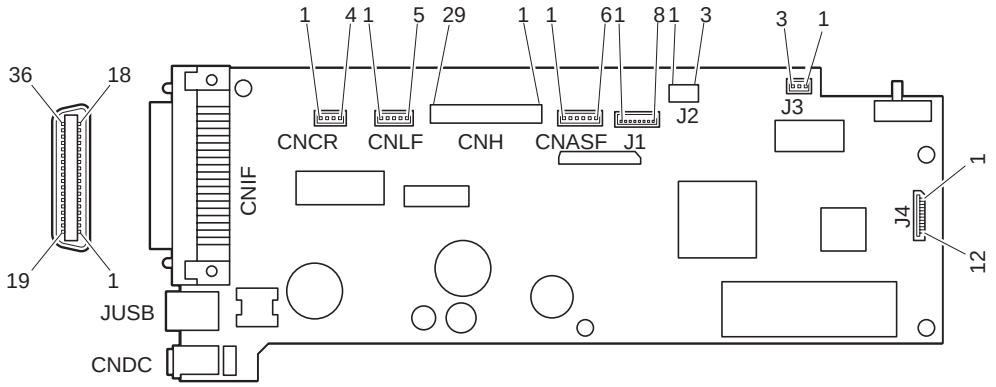


Figure 5-16 Control Board

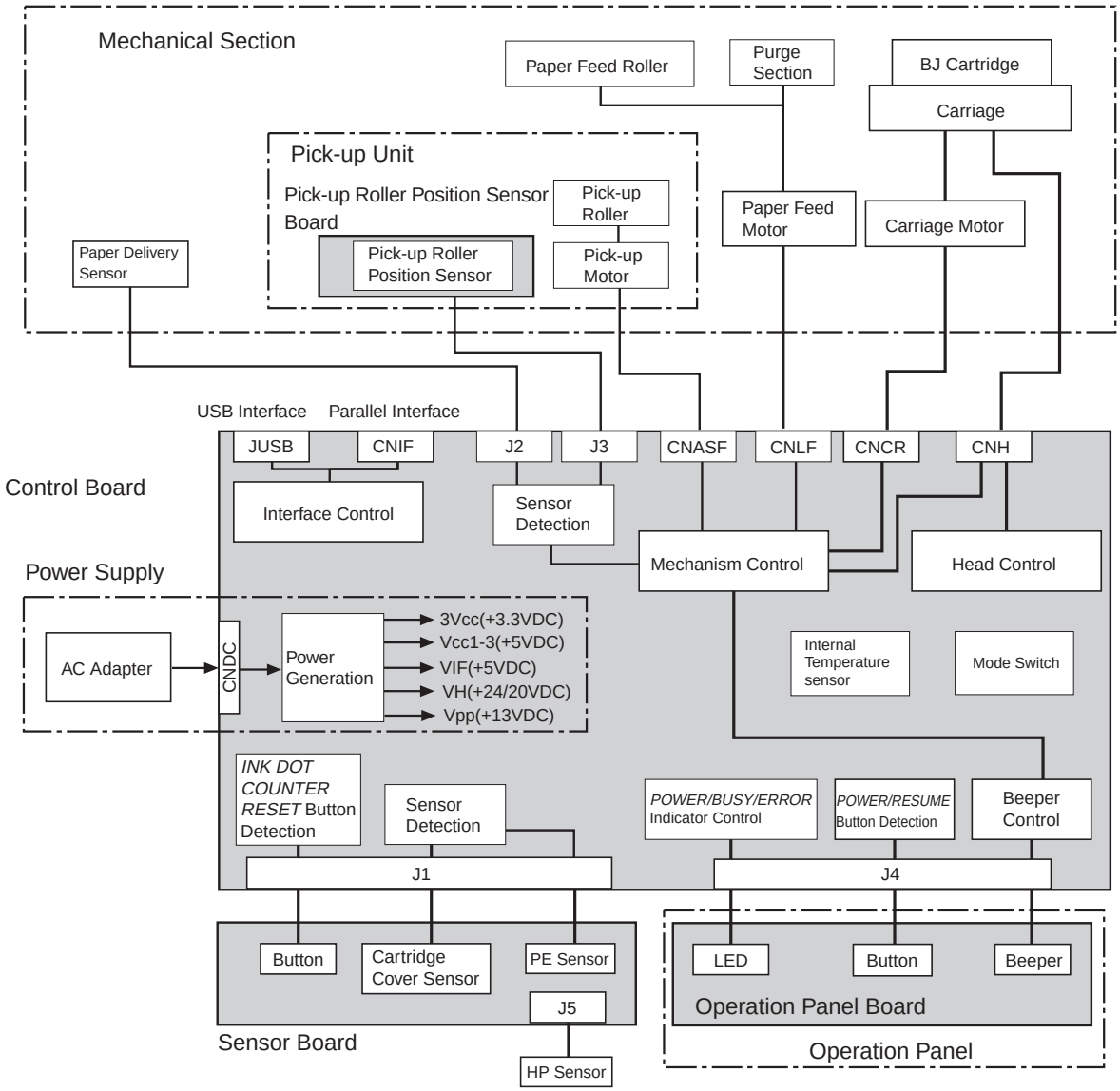


Figure 5-17 Printer Diagram

CNIF (Parallel Interface Connector)

Pin No.	Compatible Mode	Nibble Mode
1	$\overline{\text{STROBE}}$	HostClk
2	DATA1	Data1
3	DATA2	Data2
4	DATA3	Data3
5	DATA4	Data4
6	DATA5	Data5
7	DATA6	Data6
8	DATA7	Data7
9	DATA8	Data8
10	$\overline{\text{ACKNLG}}$	PrtClk
11	BUSY	PrtBusy
12	P.E.	AckDataReq
13	SELECT	Xflag
14	$\overline{\text{AUTO FEED XT}}$	HostBusy
15	N.C	Undefined
16	GND	Gnd
17	GND	Gnd
18	+5.0V	Vcc
19	$\overline{\text{STROBE-RET}}$	Signal Gnd
20	DATA1-RET	Signal Gnd
21	DATA2-RET	Signal Gnd
22	DATA3-RET	Signal Gnd
23	DATA4-RET	Signal Gnd
24	DATA5-RET	Signal Gnd
25	DATA6-RET	Signal Gnd
26	DATA7-RET	Signal Gnd
27	DATA8-RET	Signal Gnd
28	$\overline{\text{ACKNLG-RET}}$	Signal Gnd
29	BUSY-RET	Signal Gnd
30	P.E.-RET	Signal Gnd
31	$\overline{\text{INIT}}$	Init
32	$\overline{\text{ERROR}}$	DataAvail
33	GND	Undefined
34	N.C	Undefined
35	+5.0V	Undefined
36	$\overline{\text{SELECT IN}}$	1284Active

JUSB (USB Interface Connector)

Pin No.	Signal	Function
1	Vcc	Cable power supply
2	-Data	Data
3	+Data	Data
4	GND	GND

J1 (Sensor Board Connector)

Pin No.	Signal	IN/OUT	Function
1	GND	...	GND
2	C-DCR-SW	IN	*COLOR INK DOT COUNTER RESET* Button
3	BK-DCR-SW	IN	*BLACK INK DOT COUNTER RESET* Button
4	DOOR-SW	IN	Door-open sensor (H: When open, L: When closed)
5	HPS	IN	Home position sensor (H: At home position, L: Not at home position)
6	PES	IN	Paper-end sensor (H: Paper available, L: Paper out)
7	Vcc3	...	+5VDC
8	Vcc1	...	+5VDC

J2 (Paper Delivery Sensor Connector)

Pin No.	Signal	IN/OUT	Function
1	Vcc3	OUT	+5VDC
2	PTS	IN	Paper delivery sensor
3	Vcc3	OUT	+5VDC

J3 (Pick-up Roller Position Sensor Connector)

Pin No.	Signal	IN/OUT	Function
1	Vcc3	...	+5VDC
2	GND	...	GND
3	ASFHP	IN	Pick-up roller position sensor (H: At home position, L: In operation)

J4 (Operation Panel Board Connector)

Pin No.	Signal	IN/OUT	Function
1	BUSY-LED	OUT	*BUSY* indicator
2	Vcc1	OUT	+5VDC
3	ERR-LED	OUT	*ERROR* indicator
4	PWR-LED	OUT	*POWER* indicator
5	PWRON	IN	*POWER* button
6	RCV-SW	IN	*RESUME* button
7	BZOUT	OUT	Beeper
8	GND	...	GND
9	C-LED2	OUT	*COLOR INK-LOW* indicator 2
10	C-LED1	OUT	*COLOR INK-LOW* indicator 1
11	BK-LED2	OUT	*BLACK INK-LOW* indicator 2
12	BK-LED1	OUT	*BLACK INK-LOW* indicator 1

CNDC (DC Jack)

Pin No.	Signal	IN/OUT	Function
1	Vpp	IN	+13VDC
2	GND	...	GND
3	GND	...	GND

CNCR (Carriage Motor Connector)

Pin No.	Signal	IN/OUT	Function
1	$\overline{\text{BCRM}}$	OUT	Carriage motor phase $\overline{\text{B}}$
2	BCRM	OUT	Carriage motor phase B
3	$\overline{\text{ACRM}}$	OUT	Carriage motor phase $\overline{\text{A}}$
4	ACRM	OUT	Carriage motor phase A

CNLF (Paper-Feed Motor Connector)

Pin No.	Signal	IN/OUT	Function
1	VH	...	+20/24VDC
2	$\overline{\text{ALFM}}$	OUT	Paper-feed motor phase $\overline{\text{A}}$
3	$\overline{\text{BLFM}}$	OUT	Paper-feed motor phase $\overline{\text{B}}$
4	BLFM	OUT	Paper-feed motor phase B
5	ALFM	OUT	Paper-feed motor phase A

CNASF (Pick-up Motor Connector)

Pin No.	Signal	IN/OUT	Function
1	VH	...	+20/24VDC
2	$\overline{\text{A-ASFM}}$	OUT	Pick-up motor phase $\overline{\text{A}}$
3	$\overline{\text{B-ASFM}}$	OUT	Pick-up motor phase $\overline{\text{B}}$
4	B-ASFM	OUT	Pick-up motor phase B
5	A-ASFM	OUT	Pick-up motor phase A

CNH (Carriage Ribbon Cable Connector)

Pin No.	Signal	IN/OUT	Function
1	VHG	...	GND for head-driving voltage VH
2	VHG	...	GND for head-driving voltage VH
3	MCH0	OUT	Drive signal for temperature adjustment heater
4	MCH1	OUT	Drive signal for temperature adjustment heater
5	HVH	...	Head-driving voltage (+24 VDC)
6	HVH	...	Head-driving voltage (+24 VDC)
7	WHT	OUT	Subheater driving signal
8	N.C.	...	Unused
9	TOP	IN	Rank resistor's detection signal
10	DIA	OUT	Head temperature sensor's (diode) anode
11	ID0	INV	BJ cartridge (black/color) detection signal
12	ID1	IN	BJ cartridge (black/color) detection signal
13	HCONT	IN/OUT	BJ cartridge detection signal/HENABLE select signal
14	HVSS	...	Logic driving voltage GND in the head
15	HENBA	OUT	Heater driving signal in the head
16	EVENENB	OUT	Heater driving signal for the even-numbered nozzles in the head
17	HENBB	OUT	Heater driving signal in the head
18	HENBD	OUT	Heater driving signal in the head
19	ODD ENB	OUT	Heater driving signal for the odd-numbered nozzles in the head
20	BENB0	OUT	Signal for generating the block enable decoder's output signal
21	BENB1	OUT	Signal for generating the block enable decoder's output signal
22	BENB2	OUT	Signal for generating the block enable decoder's output signal
23	HVDD	...	Head's logic driving voltage +5 V
24	HCLOCK	OUT	Clock signal that transfers the print data
25	HLATCH	OUT	Timing signal that latches the print data
26	HRES	OUT	Reset signal for the latch
27	HENBC	OUT	Heater driving signal in the head
28	HDATA	OUT	Print data
29	DIK	IN	Head temperature sensor's (diode) cathode

Whether or not there is a BJ cartridge and the BJ cartridge's identification are detected with connector pin 11 (ID0), pin 12 (ID1), and pin 13 (HCONT).

Table 5-4 HEAD INSTALLATION STATUS AND SIGNAL DETECTION

	Carriage Cable Contact Pin No./Signal		
	11 ID0	12 ID1	13 HCONT
BC-10	L	L	H
BC-11e	H	L	L
BC-12e	H	H	L
Not loaded	H	H	—

2.2 Operation Panel Board

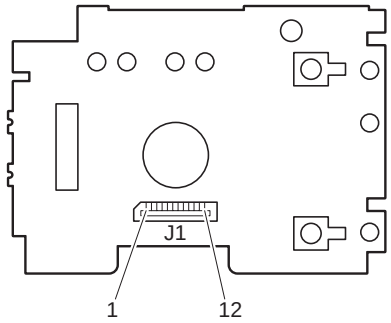


Figure 5-18 Operation Panel Board

J1 (Control Board Connector)

See *page 5-15 (J4 Operation Panel Board Connector Pin Description)*.

J1 Pin No.	Signal	IN/OUT	Function	Control Board J4 pin No.
1	BK-LED1	IN	*BLACK INK-LOW* indicator 1	12
2	BK-LED2	IN	*BLACK INK-LOW* indicator 2	11
3	C-LED1	IN	*COLOR INK-LOW* indicator 1	10
4	C-LED2	IN	*COLOR INK-LOW* indicator 2	9
5	GND	...	GND	8
6	BZOUT	IN	Beeper	7
7	RCV-SW	OUT	*RESUME* button	6
8	PWRON	OUT	*POWER* button	5
9	PWR-LED	IN	*POWER* indicator	4
10	ERR-LED	IN	*ERROR* indicator	3
11	Vcc1	...	+5 VDC	2
12	BUSY-LED	IN	*BUSY* indicator	1

2.3 Sensor Board

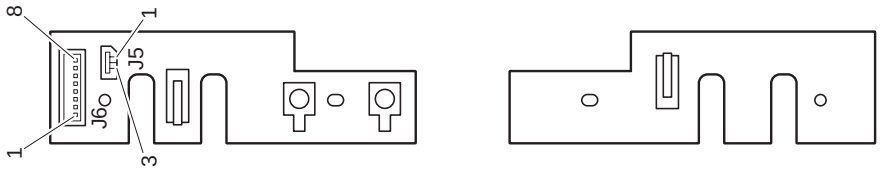


Figure 5-19 Sensor Board

J5 (Home Position Sensor Connector)

Pin No.	Signal	IN/OUT	Function
1	Vcc3	...	+5VDC
2	HPS	IN	Home position sensor
3	Vcc3	...	GND

J6 (Control Board Connector)

See *page 5-15 (J1 Sensor Board Connector Pin Description)*.

J1 Pin No.	Signal	IN/OUT	Function	Control Board J1 Pin No.
1	Vcc1	...	+5VDC	8
2	Vcc3	...	+5VDC	7
3	PES	OUT	Paper-end sensor	6
4	HPS	OUT	Home position sensor	5
5	DOOR-SW	OUT	Door-open sensor	4
6	BK-DCR-SW	OUT	*BLACK INK DOT COUNTER RESET* button	3
7	C-DCR-SW	OUT	*COLOR INK DOT COUNTER RESET* button	2
8	GND	...	GND	1

2.4 Pick-up Roller Position Sensor Board

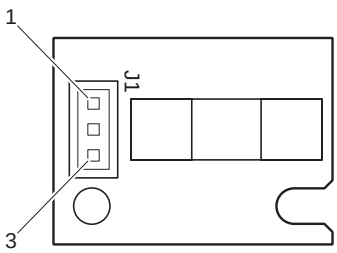


Figure 5-20 Pick-up Roller Position Sensor Board

J1 (Control Board Connector)

See *page 5-15 (J3 Pick-up Roller Position Sensor Connector Pin Description)*.

J1 Pin No.	Signal	IN/OUT	Function	Control Board J3 Pin No.
1	ASFHP	OUT	Pick-up roller position sensor	3
2	GND	...	GND	2
3	Vcc3	...	+5VDC	1

2.5 BJ Cartridge

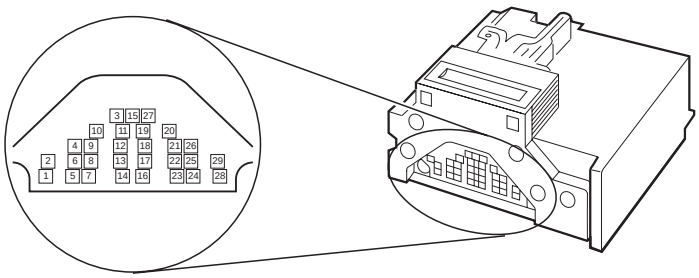


Figure 5-21 BJ Cartridge

See *page 5-17 (CNH Carriage Ribbon Cable Connector Pin Description)*.

Pin No.	Signal	IN/OUT	Function	CNH Signal
1	GNDH	...	GND for head-driving voltage VH	VHG
2	GNDH	...	GND for head-driving voltage VH	VHG
3	MCH1	IN	Drive signal for temperature adjustment heater	MCH0
4	MCH2	IN	Drive signal for temperature adjustment heater	MCH1
5	VH	OUT	Head-driving voltage (+24 V DC)	HVH
6	VH	OUT	Head-driving voltage (+24 V DC)	HVH
7	SUB	OUT	Subheater driving signal	WHT
8	Spare 1	...	Unused	N.C.
9	RNK	IN	Rank resistor's detection signal	TOP
10	DIA	IN	Head temperature sensor's (diode) anode	DIA
11	ID-0	IN	BJ cartridge (black/color) detection signal	ID0
12	ID-1	IN	BJ cartridge (black/color) detection signal	ID1
13	IND	IN/OUT	BJ cartridge detection signal	HCONT
14	GNDL	...	Logic driving voltage GND in the head	HVSS
15	HEAT-A	OUT	Heater driving signal in the head	HENBA
16	EVEN	OUT	Heater driving signal for the even-numbered nozzles in the head	EVEVENB
17	HEAT-B	OUT	Heater driving signal in the head	HENBB
18	HEAT-D	OUT	Heater driving signal in the head	HENBD
19	ODD	OUT	Heater driving signal for the odd-numbered nozzles in the head	ODD ENB
20	B-ENB0	OUT	Signal for generating the block enable decoder's output signal	BENB0
21	B-ENB1	OUT	Signal for generating the block enable decoder's output signal	BENB1
22	B-ENB2	OUT	Signal for generating the block enable decoder's output signal	BENB2
23	VDD	OUT	Head's logic driving voltage +5 V	HVDD
24	D-CLK	OUT	Clock signal that transfers the print data	HCLOCK
25	LT-CLK	OUT	Timing signal that latches the print data	HLATCH
26	RESET	OUT	Reset signal for the latch	HRES
27	HEAT-C	OUT	Heater driving signal in the head	HENBC
28	I-DAT	OUT	Print data	HDATA
29	DIK	IN	Head temperature sensor's (diode) cathode	DIK

2.6 Carriage Motor

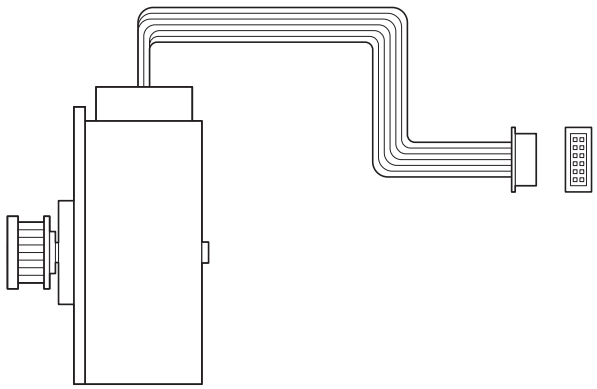


Figure 5-22 Carriage Motor

See *page 5-16 (CNCR Carriage Motor Connector Pin Description)*.

Pin No.	Signal	IN/OUT	Function	Control Board CNCR Pin No.
1	$\overline{B}$CRM	IN	Carriage motor phase $\overline{B}$	1
2	BCRM	IN	Carriage motor phase B	2
3	$\overline{A}$CRM	IN	Carriage motor phase $\overline{A}$	3
4	ACRM	IN	Carriage motor phase A	4

2.7 Paper-Feed Motor

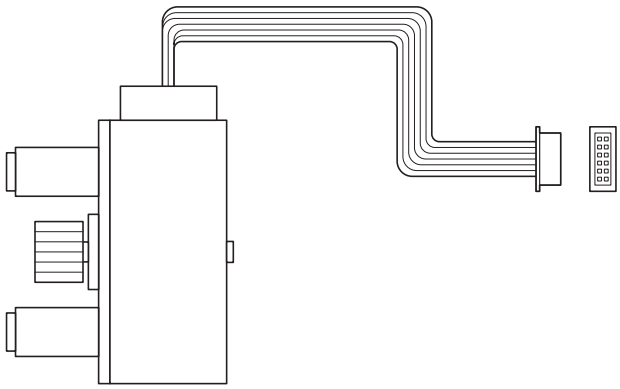


Figure 5-23 Paper-Feed Motor

See *page 5-16 (CNCF Paper-Feed Motor Connector Pin Description)*.

Pin No.	Signal	IN/OUT	Function	Control Board CNLF Pin No.
1	VH	...	+20/24 VDC (When paper-feed motor is driven.)	1
2	$\overline{A}$LFM	IN	Paper-feed motor phase $\overline{A}$	2
3	$\overline{B}$LFM	IN	Paper-feed motor phase $\overline{B}$	3
4	BLFM	IN	Paper-feed motor phase B	4
5	ALFM	IN	Paper-feed motor phase A	5

2.8 Pick-up Motor

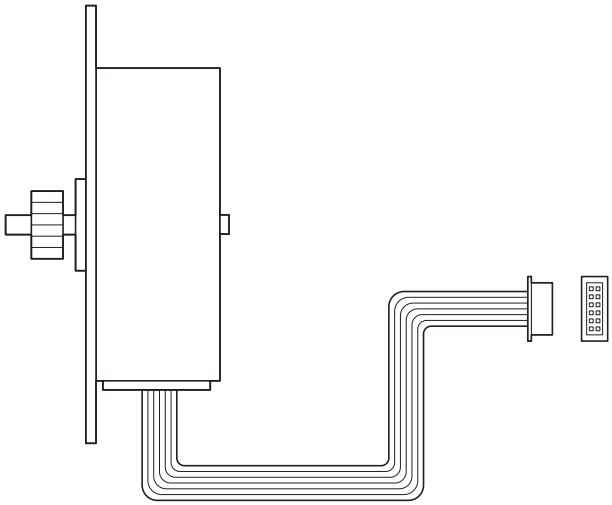
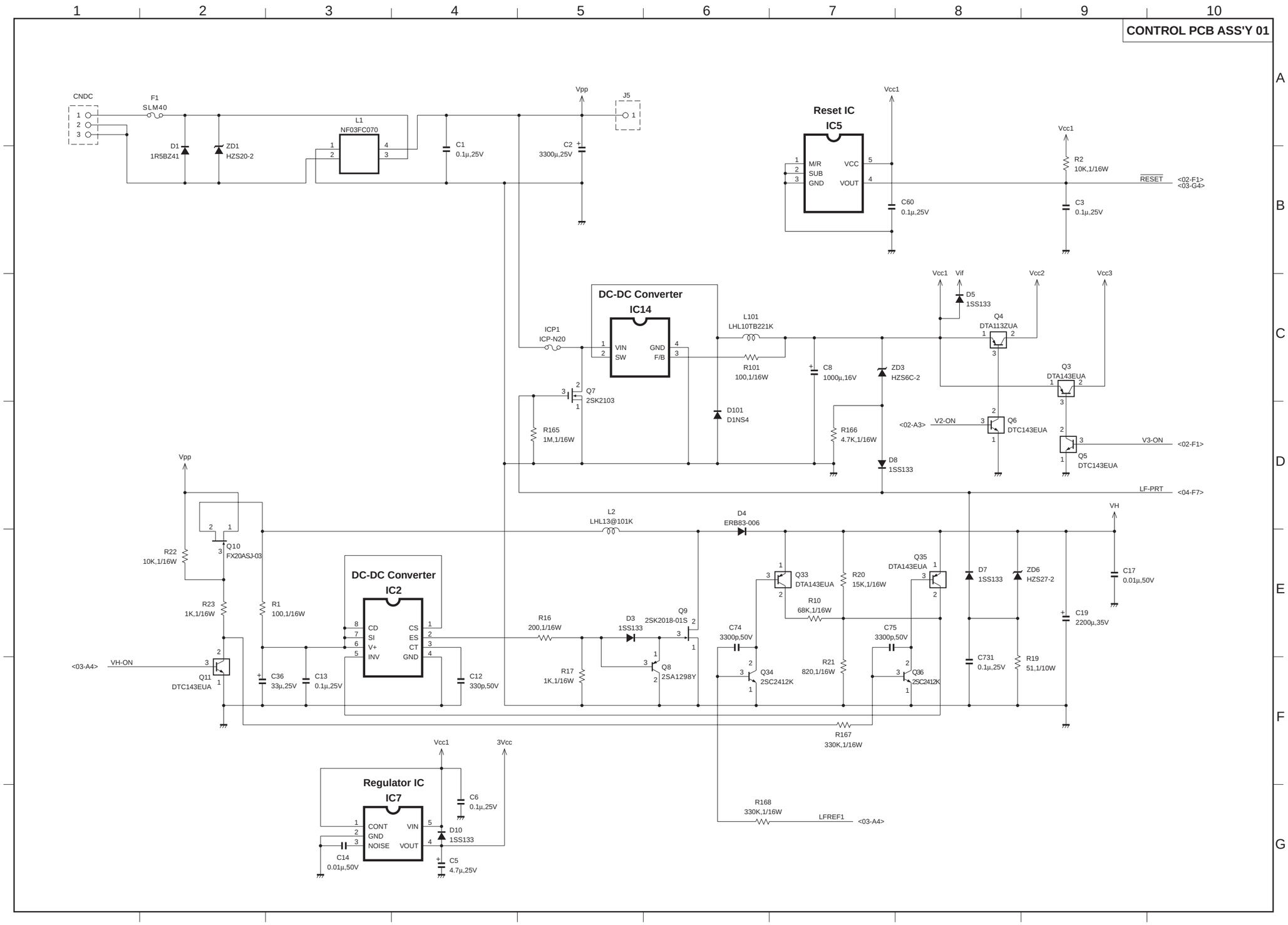


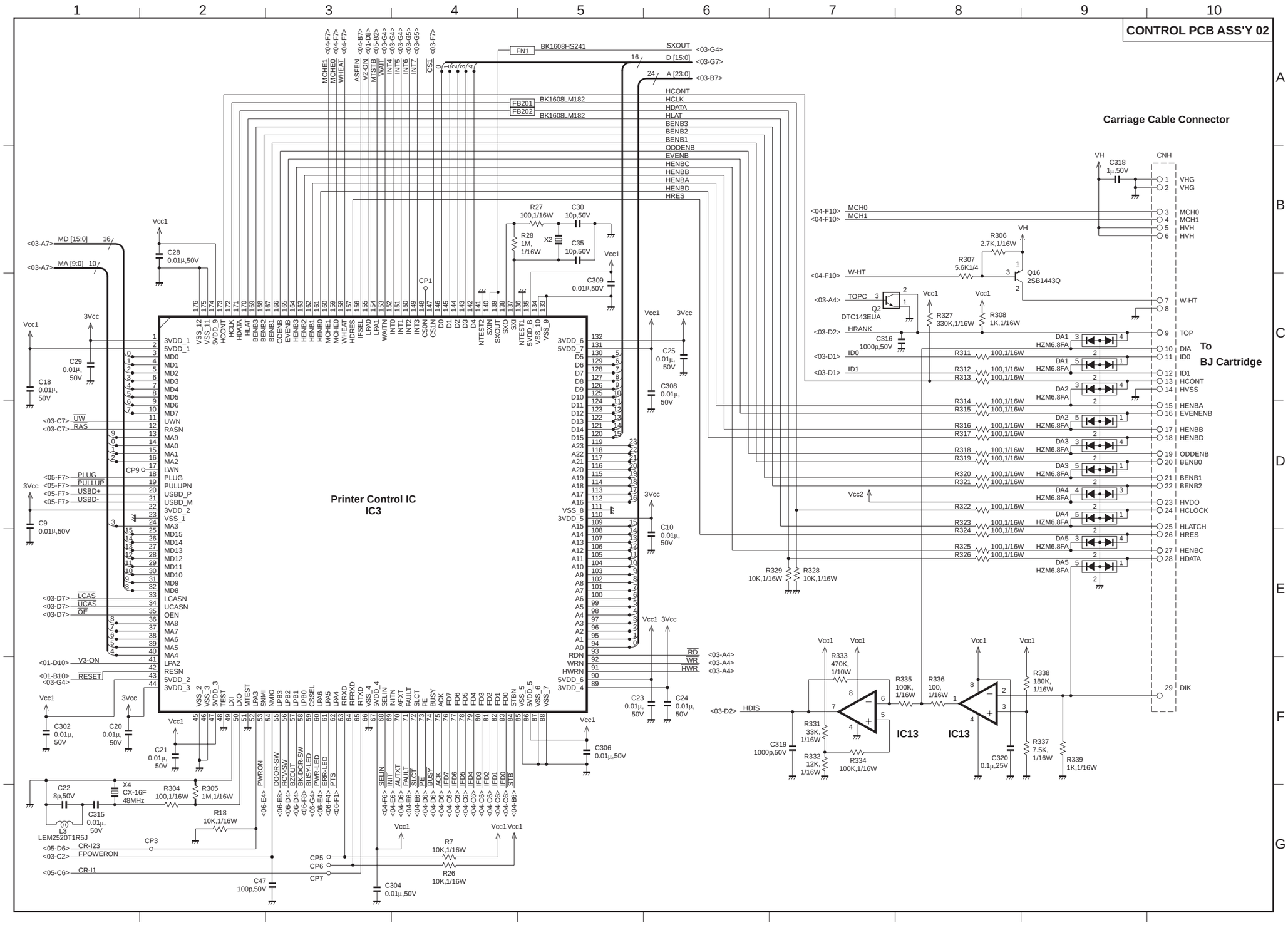
Figure 5-24 Pick-up Motor

See *page 5-16 (CNASF Pick-up Motor Connector Pin Description)*.

Pin No.	Signal	IN/OUT	Function	Control Board CNASF Pin No.
1	VH	...	+20/24 VDC (When pick-up motor is driven.)	1
2	$\overline{A}$-ASFM	IN	Pick-up motor phase $\overline{A}$	2
3	$\overline{B}$-ASFM	IN	Pick-up motor phase $\overline{B}$	3
4	B-ASFM	IN	Pick-up motor phase B	4
5	A-ASFM	IN	Pick-up motor phase A	5
6	N.C.	...	...	6

2.9 Circuit Diagram




CONTROL PCB ASS'Y 02
Printer Control IC
IC3
Carriage Cable Connector
To
BJ Cartridge
IC13
IC13
FN1
BK1608HS241
FB201
FB202
BK1608LM182
BK1608LM182
SXOUT
D [15:0]
A [23:0]
HCONT
HCLK
HDATA
HLAT
BENB3
BENB2
BENB1
ODDENB
EVENB
HENBC
HENBB
HENBA
HENBD
HRES
MD [15:0]
MA [9:0]
Vcc1
3Vcc
C28 0.01µ,50V
C29 0.01µ, 50V
C18 0.01µ, 50V
C9 0.01µ,50V
C302 0.01µ, 50V
C20 0.01µ, 50V
C21 0.01µ, 50V
C22 8p,50V
C315 0.01µ, 50V
X4 CX-16F 48MHz
L3 LEM2520T1R5J
R304 100,1/16W
R305 1M,1/16W
R18 10K,1/16W
R27 100,1/16W
R28 1M, 1/16W
C30 10p,50V
C35 10p,50V
X2
C309 0.01µ,50V
C25 0.01µ, 50V
C308 0.01µ, 50V
C10 0.01µ, 50V
C23 0.01µ, 50V
C24 0.01µ, 50V
C306 0.01µ,50V
C304 0.01µ,50V
C47 100p,50V
R7 10K,1/16W
R26 10K,1/16W
CP1
CP3
CP5
CP6
CP7
CP9
UW
RAS
LCAS
UCAS
OE
RESET
PLUG
PULLUP
USBD+
USBD-
V3-ON
RD
WR
HWR
FPOWERON
CR-I23
CR-I1
PWRON
VH
CNH
C318 1µ,50V
R306 2.7K,1/16W
R307 5.6K1/4
Q16 2SB1443Q
Q2 DTC143EUA
R327 330K,1/16W
R308 1K,1/16W
C316 1000p,50V
R311 100,1/16W
R312 100,1/16W
R313 100,1/16W
R314 100,1/16W
R315 100,1/16W
R316 100,1/16W
R317 100,1/16W
R318 100,1/16W
R319 100,1/16W
R320 100,1/16W
R321 100,1/16W
R322 100,1/16W
R323 100,1/16W
R324 100,1/16W
R325 100,1/16W
R326 100,1/16W
R329 10K,1/16W
R328 10K,1/16W
Vcc2
DA1 HZM6.8FA
DA2 HZM6.8FA
DA3 HZM6.8FA
DA4 HZM6.8FA
DA5 HZM6.8FA
R333 470K, 1/10W
R335 100K, 1/16W
R336 100, 1/16W
R338 180K, 1/16W
R331 33K, 1/16W
R332 12K, 1/16W
R334 100K,1/16W
C319 1000p,50V
C320 0.1µ,25V
R337 7.5K, 1/16W
R339 1K,1/16W
HDIS
MCH0
MCH1
HVH
W-HT
TOPC
HRANK
ID0
ID1
VHG
TOP
DIA
ID0
ID1
HCONT
HVSS
HENBA
EVENENB
HENBB
HENBD
ODDENB
BENB0
BENB1
BENB2
HVDO
HCLOCK
HLATCH
HRES
HENBC
HDATA
DIK

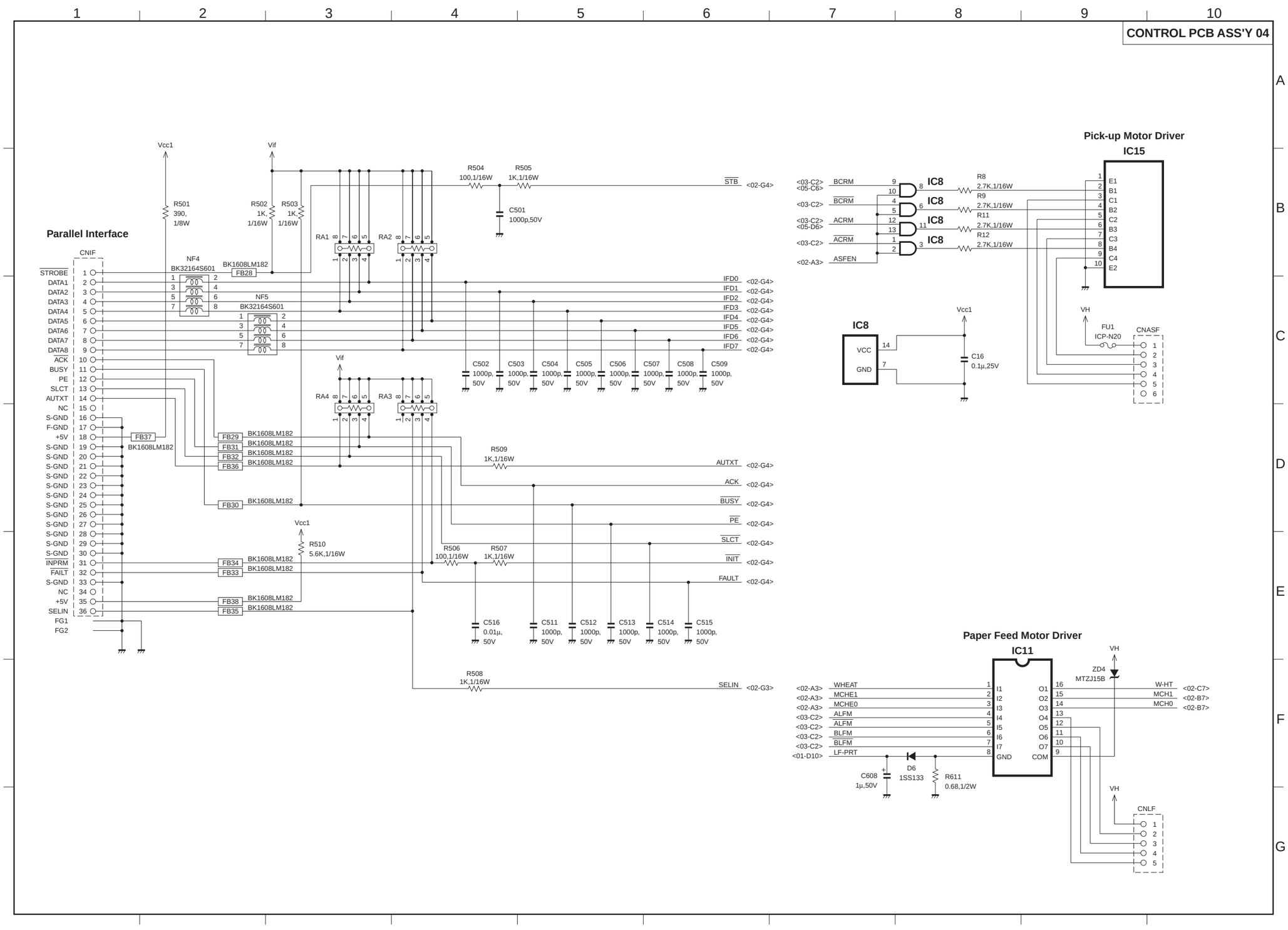
CONTROL PCB ASS'Y 03

MPU
IC1

DRAM
IC16

Control ROM
IC19S

Thermister


CONTROL PCB ASS'Y 04
Parallel Interface
CNIF
STROBE 1
DATA1 2
DATA2 3
DATA3 4
DATA4 5
DATA5 6
DATA6 7
DATA7 8
DATA8 9
ACK 10
BUSY 11
PE 12
SLCT 13
AUTXT 14
NC 15
S-GND 16
F-GND 17
+5V 18
S-GND 19
S-GND 20
S-GND 21
S-GND 22
S-GND 23
S-GND 24
S-GND 25
S-GND 26
S-GND 27
S-GND 28
S-GND 29
S-GND 30
INPRM 31
FAILT 32
S-GND 33
NC 34
+5V 35
SELIN 36
FG1
FG2
Vcc1
Vif
R501 390, 1/8W
R502 1K, 1/16W
R503 1K, 1/16W
R504 100,1/16W
R505 1K,1/16W
C501 1000p,50V
NF4 BK32164S601
NF5 BK32164S601
BK1608LM182 FB28
RA1
RA2
RA3
RA4
FB37 BK1608LM182
FB29 BK1608LM182
FB31 BK1608LM182
FB32 BK1608LM182
FB36 BK1608LM182
FB30 BK1608LM182
FB34 BK1608LM182
FB33 BK1608LM182
FB38 BK1608LM182
FB35 BK1608LM182
R509 1K,1/16W
R510 5.6K,1/16W
R506 100,1/16W
R507 1K,1/16W
R508 1K,1/16W
STB <02-G4>
IFD0 <02-G4>
IFD1 <02-G4>
IFD2 <02-G4>
IFD3 <02-G4>
IFD4 <02-G4>
IFD5 <02-G4>
IFD6 <02-G4>
IFD7 <02-G4>
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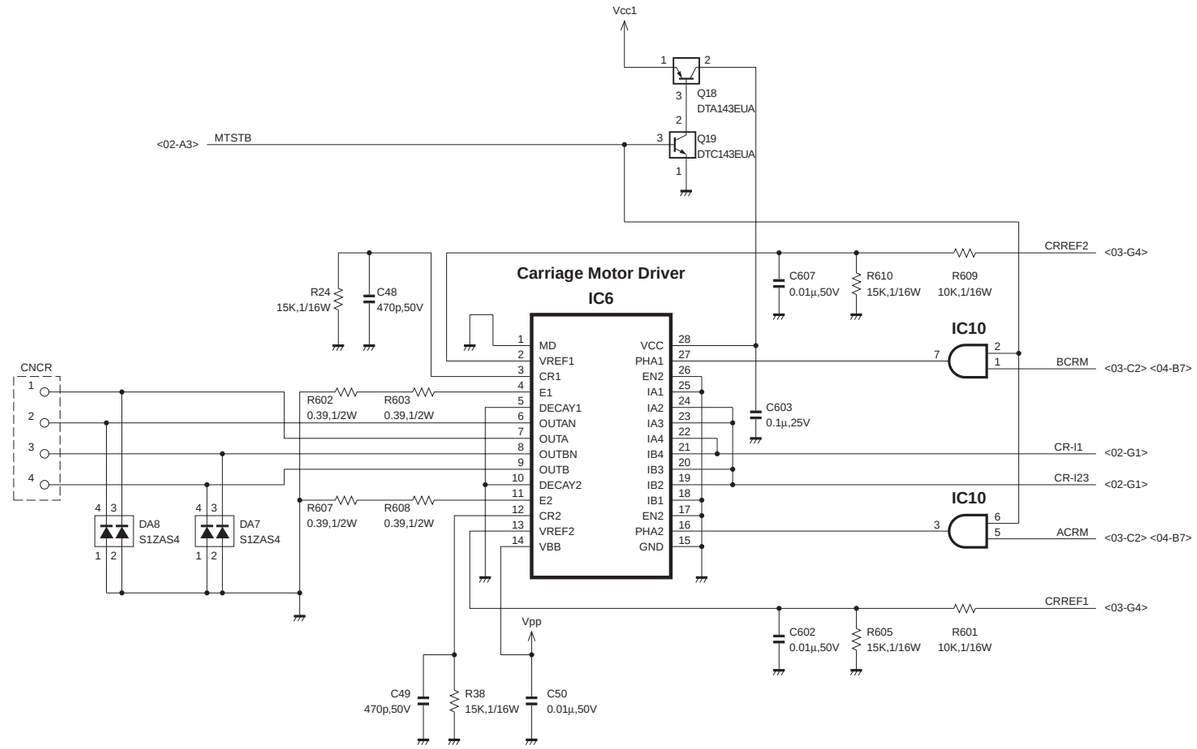
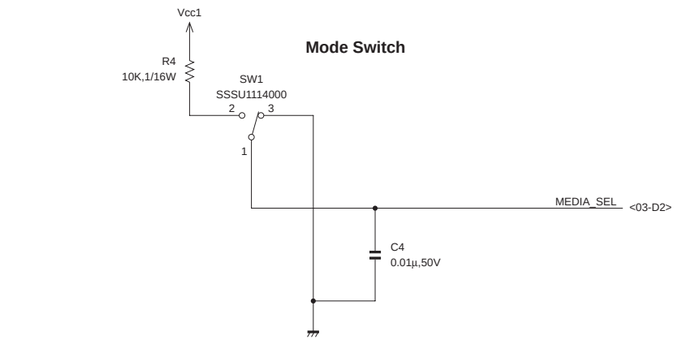
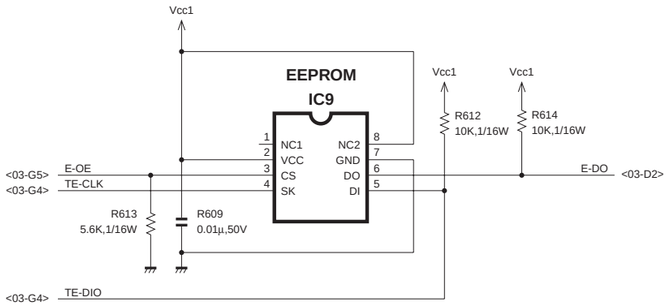
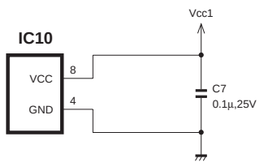
ACK <02-G4>
BUSY <02-G4>
PE <02-G4>
SLCT <02-G4>
INIT <02-G4>
FAULT <02-G4>
SELIN <02-G3>
C502 1000p, 50V
C503 1000p, 50V
C504 1000p, 50V
C505 1000p, 50V
C506 1000p, 50V
C507 1000p, 50V
C508 1000p, 50V
C509 1000p, 50V
C516 0.01µ, 50V
C511 1000p, 50V
C512 1000p, 50V
C513 1000p, 50V
C514 1000p, 50V
C515 1000p, 50V
Pick-up Motor Driver
IC15
IC8
R8 2.7K,1/16W
R9 2.7K,1/16W
R11 2.7K,1/16W
R12 2.7K,1/16W
<03-C2> BCRM
<05-C6>
<03-C2> BCRM
<03-C2> ACRM
<05-D6>
<03-C2> ACRM
<02-A3> ASFEN
C16 0.1µ,25V
VH
FU1 ICP-N20
CNASF
Paper Feed Motor Driver
IC11
ZD4 MTZJ15B
<02-A3> WHEAT
<02-A3> MCHE1
<02-A3> MCHE0
<03-C2> ALFM
<03-C2> ALFM
<03-C2> BLFM
<03-C2> BLFM
<01-D10> LF-PRT
W-HT <02-C7>
MCH1 <02-B7>
MCH0 <02-B7>
C608 1µ,50V
D6 1SS133
R611 0.68,1/2W
CNLF

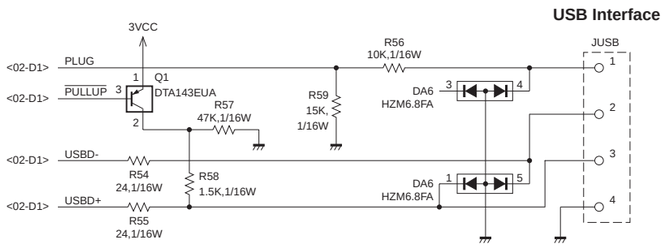
CONTROL PCB ASS'Y 05





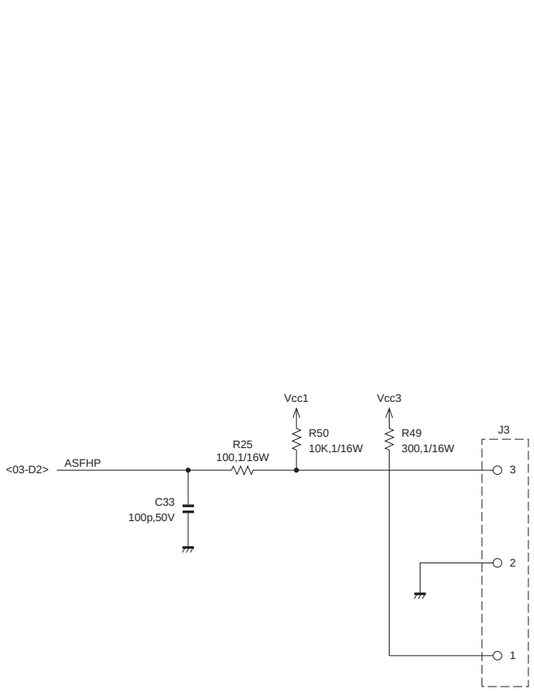




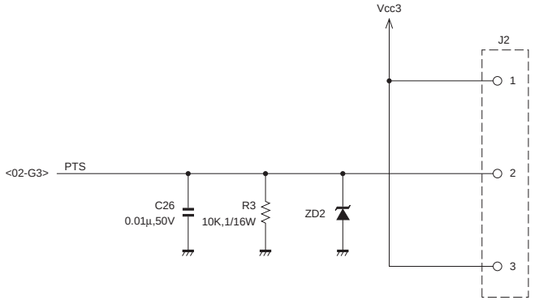


Appendix

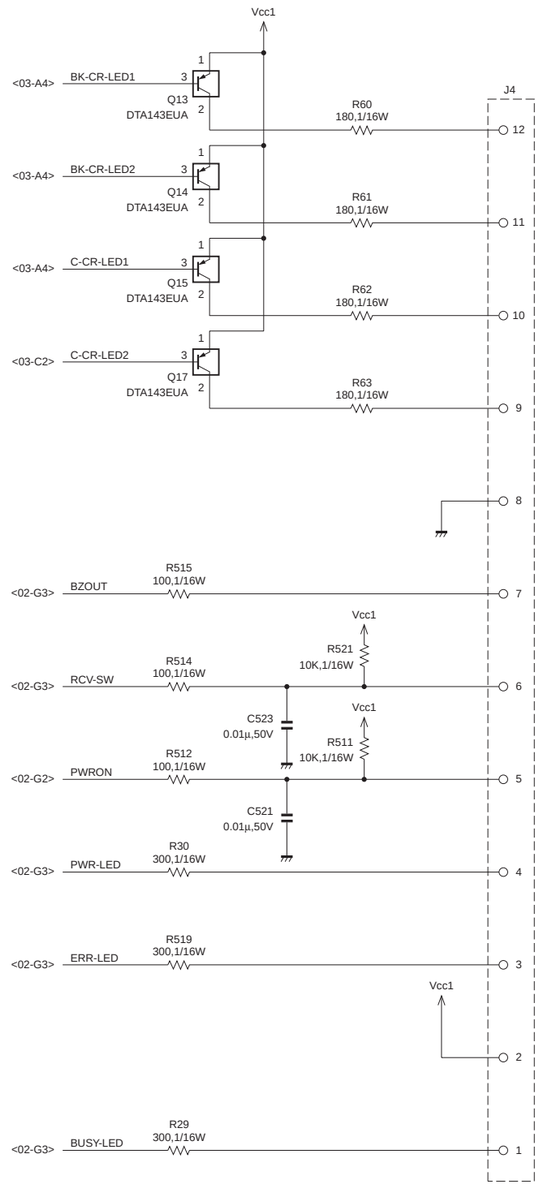
CONTROL PCB ASS'Y 06



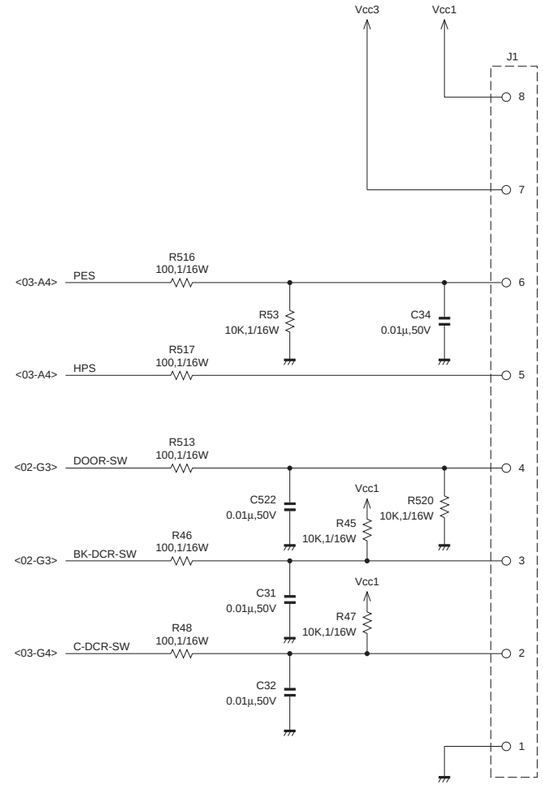
Pick-up Roller Position Sensor Connector



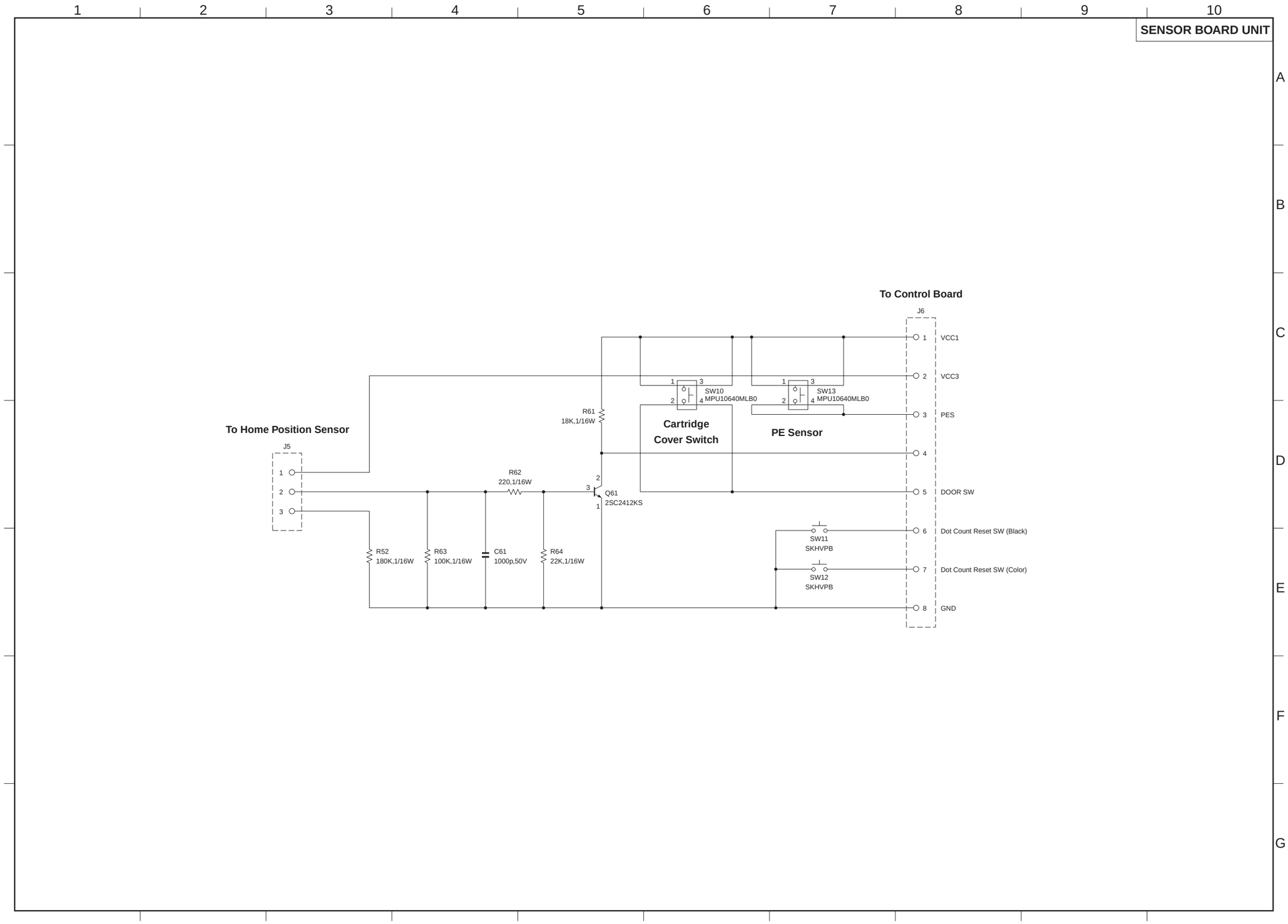
Paper Delivery Sensor Connector

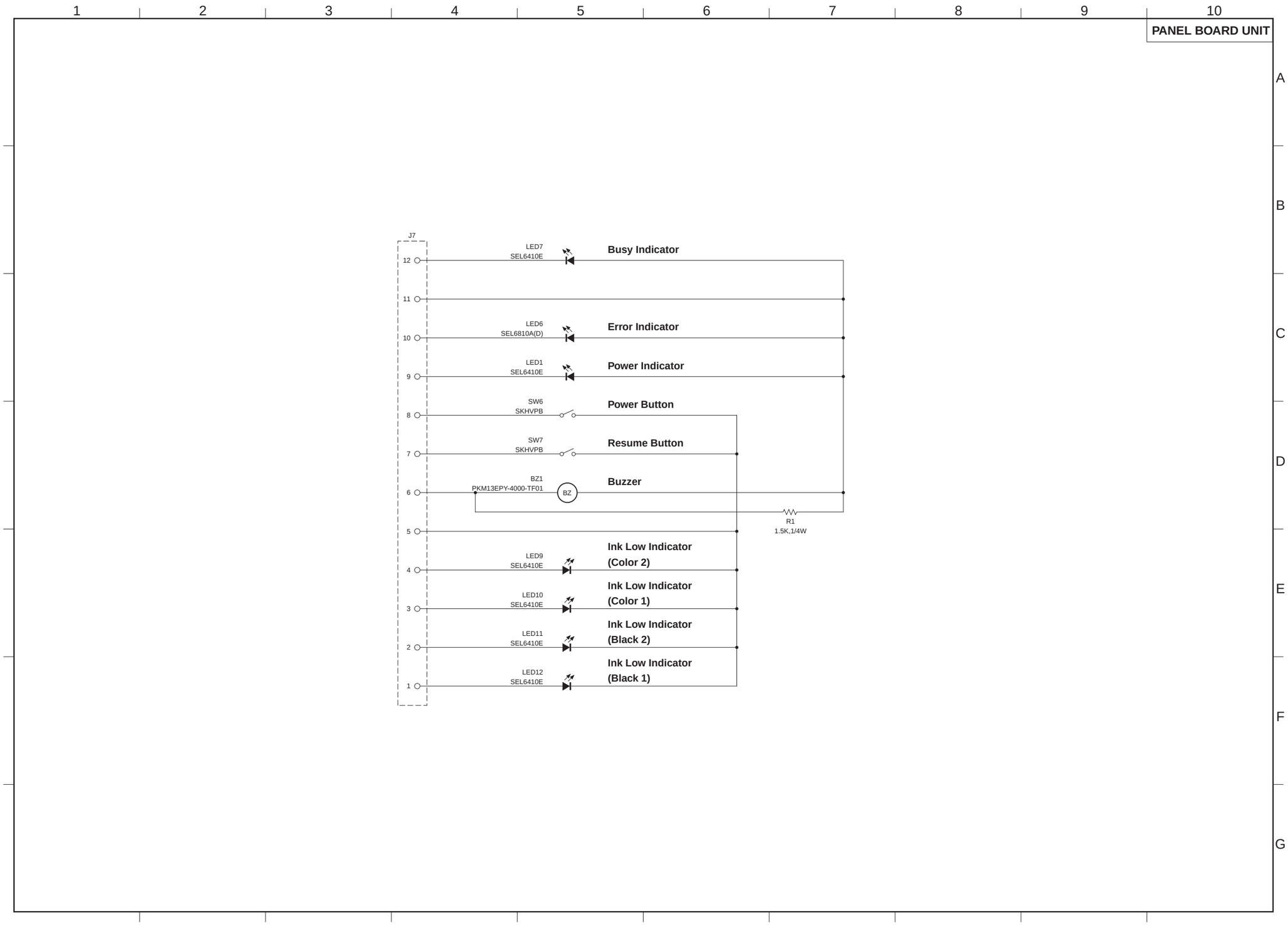


Operation Panel Board Connector



Sensor Board Connector


SENSOR BOARD UNIT
To Control Board
J6
1 VCC1
2 VCC3
3 PES
4
5 DOOR SW
6 Dot Count Reset SW (Black)
7 Dot Count Reset SW (Color)
8 GND
SW10
MPU10640MLB0
SW13
MPU10640MLB0
Cartridge
Cover Switch
PE Sensor
R61
18K,1/16W
To Home Position Sensor
J5
R62
220,1/16W
Q61
2SC2412KS
SW11
SKHVPB
SW12
SKHVPB
R52
180K,1/16W
R63
100K,1/16W
C61
1000p,50V
R64
22K,1/16W


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
PANEL BOARD UNIT
J7
12
11
10
9
8
7
6
5
4
3
2
1
LED7
SEL6410E
Busy Indicator
LED6
SEL6810A(D)
Error Indicator
LED1
SEL6410E
Power Indicator
SW6
SKHVPB
Power Button
SW7
SKHVPB
Resume Button
BZ1
PKM13EPY-4000-TF01
BZ
Buzzer
R1
1.5K,1/4W
LED9
SEL6410E
Ink Low Indicator
(Color 2)
LED10
SEL6410E
Ink Low Indicator
(Color 1)
LED11
SEL6410E
Ink Low Indicator
(Black 2)
LED12
SEL6410E
Ink Low Indicator
(Black 1)

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100% waste paper.

Canon

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